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DEPARTMENT OF THE INTERIOR.

UNITED STATES ENTOMOLOGICAL COMMISSION.

BULLETIN NO. 6.

GENERAL INDEX

AND

SUPPLEMENT

TO THE

NINE REPORTS

ON THE

INSECTS OF MISSOURI.

BY

CHARLES V. RILEY, M. A., Ph. D.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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C. V. RILEY, *Chief.*
A. S. PACKARD, JR., *Secretary.*
CYRUS THOMAS, *Disbursing Agent.*

ORDER OF MATTER.

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1. Introduction.
2. Table of Contents.
3. Corrections.
4. Notes and Additions.
5. Descriptions of New Species and Varieties.
6. List of Descriptions of Adolescent States.
7. List of Descriptions, mostly amplified, of Species not new.
8. List of Illustrations by Reports.
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INTRODUCTION.

The present Bulletin has been prepared in response to frequent suggestions from those having occasion to use the nine Annual Reports on the Insects of Missouri, made by me, as State Entomologist, to the State Board of Agriculture, during the years 1868 to 1877, inclusive. These Reports contain a good deal of matter anent the Cotton Worm, the Chinch Bug, the Rocky Mountain Locust, and other insects which the Commission has studied, and were published, as required by law, in the Annual Reports of said State Board of Agriculture for the years mentioned. That method of publication was always regretted by myself and by many others, inasmuch as the reports of the Board were generally volumes of such bulk as to delay publication and render mailing expensive. By virtue of the fact that they were distributed only to members of the State legislature and to State societies, access to them by persons outside the State of Missouri was extremely difficult; while the State printing and press-work were, as a rule, of a very unsatisfactory character. To avoid some of these difficulties it was my habit to have about 300 separate copies of the entomological portion printed on better paper, at my own expense, for distribution to correspondents both at home and abroad, and it is through these, principally, that the Reports have been accessible outside the State.

The demand for the Reports and the manner in which they have been used and commended by subsequent writers can but be gratifying to the author, who feels that whatever of commendation they deserve is due to the fact that they embody results of original investigation. They contain some matter that, with present light, he would expunge, and the earlier volumes, more particularly, contain imperfections which no one appreciates more fully than himself. Many of these are attributable to isolation from other working entomologists at the time, as well as to the almost absolute dearth of entomological works of reference in any of the libraries of Saint Louis.

The general plan of the Reports, which were addressed to the intelli-

gent cultivator of the soil rather than to the naturalist, is set forth in the following passage from the introduction to the first:

> Fully aware that I write for those who, as a rule, are unversed in entomology, I have endeavored to treat of each insect with as little of the nomenclature of science as is consistent with clearness of expression. Yet, as much that is of scientific interest, such as descriptions of new species, must necessarily be inserted, I have had such descriptions printed in a type of smaller size than the text, so that it can be skipped if desirable, at the time of reading, and easily referred to for comparison, with specimens which one is desirous of naming. I have also endeavored to illustrate, as far as possible, the insects of which this report treats, believing that good illustration forms the basis of successful teaching in a science with which the general husbandman is not expected to be acquainted; for the eye conveys to the mind, in an instant, what the ear would fail to do in an hour. The practical man cares little to what genus or family an insect belongs, so long as he can tell whether it be friend or foe. He must become familiarized with the insects about him without having necessarily to overcome scientific detail and technicality.
>
> I have made no effort at a systematic arrangement of the insects treated of. Indeed, that were useless for the purpose in view; but, in order that the reader may refer the more readily to any particular insect which interests him, I have separated them into three series—NOXIOUS, BENEFICIAL, and INNOXIOUS—and attached a very full index. For the benefit of those who are making a study of entomology, I have also given, with each species, the Order and Family to which it belongs, in parenthesis under each heading.
>
> So far as possible, I have used a common name for each insect, knowing that the scientific name is remembered with greater difficulty, and is, consequently, distasteful to many. But as popular names are very loosely applied, and the same name often refers to different insects, in different localities, a great deal of confusion would ensue without the scientific name, which is, therefore, invariably added, for the most part, in parentheses, so that it may be skipped without interfering in any way with the sense of the text.

In order to add value to this general index, I have brought together tables of contents of the nine volumes and given corrections and some notes and additions. I have also reproduced the descriptions of new species, and added a list of descriptions of adolescent states, of descriptions of species not new, of illustrations by reports, of illustrations by classification, and of food-plants.

The Reports were independently paginated, and the separate copies were often distributed before the Agricultural Report was off the press. The date of publication and distribution is given for each in the tables of contents. The nomenclature of the Reports is retained in this Bulletin, the synonomy being indicated in the notes and additions and with the reproduced descriptions. The name of the author of the species and not of the genus was always given as authority, and in the later Reports I endeavored to indicate whether or not the insect was described under the generic name which it bears, by adding the authority without a comma when the specific name is coupled with the generic name under which it was first published — *e. g.*, *Phycita nebulo* Walsh — but placed it in parentheses when a different generic name was used than that under which the insect was first described — *e. g.*, *Acrobasis nebulo* (Walsh) — except where the whole name was already in parentheses when a comma

was used for the same purpose — *e. g.* (*Acrobasis nebulo*, Walsh). The same plan is adopted throughout this Bulletin.

It had always been my intention to publish a tenth volume and to end the decade with a review of, and general index to, the whole series. Indeed, an appropriation for the tenth year's work was made and the tenth report would have been duly issued had I not been called at the time to my present work for the General Government. This Bulletin is, in a measure, the fulfillment of that intention, and is issued in the hope that it will render the Reports more serviceable to the student of insect life and to those having to deal with insects injurious to agriculture.

My thanks are due to Messrs. E. A. Schwarz and W. H. Patton, agents of the Commission, for aid in its preparation.

C. V. R.

WASHINGTON, D. C., *March* 1, 1881.

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Neither of the first five volumes contained a table of contents, the plan of giving such having been adopted with the sixth. Most of these tables are, therefore, prepared for this Bulletin, while those of the Sixth and Seventh Reports are amplified. Those of the last two volumes are reproduced as they were originally made.

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CORRECTIONS.

A list of errata is given for each volume, and they are here reproduced with such additional ones as were previously omitted. Where foreign terms were not properly accentuated in the Reports, it was often due to the imperfect "plant" possessed by the State printer. In counting lines the running page title is omitted.

REPORT I.

Page 8, line 21, *for* being *read* were.
Page 10, line 1, *for* Figure 3,[3] *read* Figure 3,[2].
Page 12, line 20, *for* last *read* 1866.
Page 12, line 3 from bottom, *after* February *add* (1867).
Page 12, line 13 from bottom, *for* verter *read* venter.
Page 14, line 24, *for* hermaphrodite *read* agamic.
Page 14, line 32, *for* females *read* males.
Page 15, line 10 from bottom, *for* muscle-shaped *read* mussel-shaped.
Page 22, line 2 from bottom, *for* pupas *read* pupæ.
Page 30, note, *for* F. *read* T.
Page 31, line 15, *for* 37° *read* 38°.
Page 32, line 4, *for* Kreitz *read* Kreutz.
Page 32, line 14 from bottom, *for* III *read* V.
Page 32, line 7 from bottom, *for* XIII *read* VIII.
Page 38, line 5, for *Tredeim* read *Tredecim*.
Page 47, line 16, *for* far *read* for.
Page 50, line 7, *for* none the less *read* no more.
Page 53, line 28, *for* laid *read* lain.
Page 54, line 4 from bottom, *for* hatch *read* are deposited.
Page 56, lines 5 and 12, *for* to *read* at.
Page 58, line 15 from bottom, for *Aspidiglossa* read *Aspidoglossa*.
Page 64, line 26, *omit* again.
Page 67, line 11 from bottom, *for* class *read* branch.
Page 76, line 48, *for* Climbing Rustic *read* Climbing Cut-worm Moth.
Page 78, line 46, for *unipuncta ta* read *unipuncta*.
Page 86, line 21, and wherever they occur, *for* Guénée *read* Guenée; and *for* Guén. *read* Guen.
Page 87, line 11 from bottom, *for* F. *read* T.
Page 96, note, line 4, *for* West. *read* Wesm.
Page 112, line 3, *for* abreviated *read* abbreviated.
Page 114, line 1, after "insect" read (*Stiretrus fimbriatus*, Say).
Page 120, line 30, after "Cottonwood" read (*Pemphigus vagabundus*, Walsh).
Page 123, last line, for *eriosoma* read *eriosomatis*.
Page 132, line 16, for *ampelopsis* read *ampelopsidis*.
Page 133, in heading, *for* Codling *read* Berry Moth.
Page 133, line 24 from bottom, *for* preceding insect *read* Grape Curculio.
Page 134, line 3 from bottom, *for* Part V *read* Part VI.

Page 142, under the heading, *add* (LEPIDOPTERA TORTRICIDÆ).
Page 150, line 26, *for* THYRIDOPTERYX *read* THYRIDOPTERIGIS.
Page 150, line 37, *for* ferruginuous *read* ferruginous.
Page 154, in the heading, for *zeas* read *zeæ*.
Page 155, line 13, *for* ZEAS *read* ZEÆ.
Page 161, line 38, *for* Trallien *read* Trallian.
Page 166, under heading, *add* (LEPIDOPTERA, PYRALIDÆ).
Page 171, line 3 from bottom, *for* transformation *read* transformations.
Page 173, line 3 from bottom, *for* it *read* the more liquid parts.
Page 174, line 3 from bottom, for *Solidaga* read *Solidago*.
Page 175, line 32, *add* front *before* wing.
Page 176, line 21, *for* through *read* into.
Page 177, line 26, *strike out* in.
Page 177, line 13, after *coxæ* read *trochanters*.
Page 178, lines 2 and 3, *for* GELECHIA *read* GELECHILÆ.
Page 179, line 32, *for* assimilating *read* assimulating.
Page 179, in heading and line 12, for CHICKWEED read KNOTWEED.
Page 179, lines 12, 13, for (*Stellaria media*) read (*Polygonum aviculare.*)
Page 180, line 7, for *Cersium lanceolata* read *Cirsium lanceolatum*.

REPORT II.

Page 8, line 14 from bottom, *for* I have *read* has been.
Page 8, line 13, from bottom, *before* on *read* largely from Mr. Walsh's previous writings.
Page 13, line 25, *for* cupable *read* culpable.
Page 16, line 13, *for* lava *read* larva.
Page 23, line 6 from bottom, *for* hole *read* holes.
Page 32, line 17, *for* insect *read* insects.
Page 35, line 24, for *Corimelæna* read *Corimelæna*.
Page 40, line 23, for *Ophinsa* read *Ophiusa*.
Page 41, line 25, for *Laphrygma* read *Laphygma*.
Page 50, line 5 from bottom, for *leuca*[*i*]*æ* read *leucan*[*i*]*æ*.
Page 53, line 12, for *perpulcra* read *perpulchra*.
Page 56, line 7 from bottom, for *Salanum* read *Solanum*.
Page 58, line 19, for *copalina* read *copallina*.
Page 59, line 9 from bottom, *for* varigated *read* variegated.
Page 76, line 4 from bottom, *for* I *read* V.
Page 76, line 5 from bottom, for *Daphni* read *Daphne*.
Page 82, line 25, *for* one *read* our.
Page 92, line 3, *for* 125–131 *read* 129–131.
Page 107, line 12, for *Naturalista* read *Naturaliste*.
Page 111, line 34, for *crysalis* read *chrysalis*.
Page 116, line 4 from bottom, *for* month *read* molt.
Page 118, line 2, *for* carved *read* curved.

REPORT III.

Page 6, line 3 from bottom, *for* Rosa *read* Rose; and for *rosa* read *rosæ*.
Page 7, line 31, for *Hyleœctus* read *Hylecœtus*.
Page 25, line 8 from bottom, *for* finely *read* finally.
Page 28, line 3 from bottom, *for* Holmgreu's *read* Holmgren's.
Page 30, line 16, *for* the *read* the.
Page 30, line 16, *for* characterize *read* distinguish.
Page 47, line 3, *for* Feunde *read* Feinde.
Page 55, line 50, *for* that *read* than.
Page 57, line 18 from bottom, add *c* before the first *h*.
Page 58, line 3 from bottom, for *fornudolosus* read *formidolosus*.

Page 64, line 19, for *Bignonio* read *Bignonia*.
Page 78, note, *for* I *read* II.
Page 95, line 26, *for* belongs *read* belonging.
Page 117, line 5 from bottom, *for* Harr. *read* Fabr.
Page 123, last line, *for* an *read* and.
Page 129, lines 12 and 17, for *Colosoma* and *Calosoma*.
Page 131, line 13 from bottom, *for* fauns *read* fauna.
Page 135, line 33, *for* dints *read* dents; and line 21, for *a* read *b*.
Page 136, line 22, *for* Guenèe *read* Guenée.
Page 136, line 33, *for* Furtsenthum Walldeck *read* Fürstenthum Waldeck.
Page 145, line 35, *strike out second* the.
Page 146, line 24, *add* s *to* transformation.
Page 150, line 14, at end, *add* from an.
Page 151, line 12, for *Cnythia* read *Cynthia*.
Page 166, line 16 from bottom, strike out first comma.
Page 166, line 6 from bottom, for *phalangea* read *phalanga*.
Page 169, line 33, for first *i* read *e*.
Page 170, line 10, *for* Nnaural *read* natural.

REPORT IV.

Page 6, first verse, *for* grow *read* grows.
Page 19, line 8, *for* 5 *read* 6.
Page 20, last line but one, *for* R *read* U.
Page 22, last line but one, for *Aleochora* read *Aleochara*.
Page 40, line 9 from bottom, *for* occular *read* ocular.
Page 41, line 59, *for* Vt. *read* Ct.
Page 41, line 15 from bottom, *after* "*Larva*" *read* Length 0.5 inch.
Page 42, line 5, *add a comma after* Lepidoptera.
Page 43, line 6 from bottom, *for* claud *read* cloud.
Page 46, line 29, *for* edgae *read* edge.
Page 46, line under heading, *add a comma after* Lepidoptera.
Page 47, line 30, *for* rhomboidally *read* trapezoidally.
Page 53, line 25, and page 54, line 27, for *basillare* read *basilare*.
Page 53, *strike out all after* for many *in the note*.
Page 59, line 10 from bottom, *add* winged *before* female.
Page 67, line 4 from bottom, for *Cordifolia* read *Riparia*.
Page 68, line 2 from bottom, for *Oid* read *Oil*.
Page 75, third line in heading, *add a comma after* Lepidoptera.
Page 103, third line of note, *for* insest *read* insert.
Page 105, line 8 from bottom, *for* chrysallis *read* chrysalis.
Page 110, line 3, for CHALSIS read CHALCIS.
Page 110, line 29, for *extramatis* read *extrematis*.
Page 112, in the heading, *for* Hübn *read* Drury.
Page 132, line 19, *for* Chesnut *read* Chestnut.
Page 137, line 1, *for* Pernyi Silkworm *read* Perny Silkworm.
Page 137, under fig. 60, *for* Pernyi *read* Perny.

REPORT V.

Page 7, line 22, *for* stage *read* state.
Page 7, second line from bottom, *strike out second* the.
Page 8, explanation of Fig. 1, first line, *for* and *read* the.
Page 9, under Fig. 2, for BEMBEX FASCIATA read VESPA MACULATA.
Page 9, line 11, *for last* and *read* with the.
Page 11, line 9 from bottom, *after* worm *add* moth.
Page 11, line 3, from bottom, *for* four *read* eight.
Page 12, line 24, *for* ἑτεροῖς *read* ἕτερος.

Page 12, Fig. 5, for EUSCHISTES read EUSCHISTUS.
Page 13, line 3 from bottom, *for* larvæ are *read* larva is.
Page 14, under Fig. 8, for ŒDIPODA DIFFERENTIALE read CALOPTENUS DIFFERENTIALIS.
Page 18, line 10 from bottom, *for* pollenation *read* pollination.
Page 19, line 30, for *Lymexilon* read *Lymexylon.*
Page 21, line 8 from bottom, *for* Townsend *read* Townend.
Page 24, line 13, *for* ærial *read* aërial.
Page 33, in Fig. 15, *for* cloroform *read* chloroform.
Page 43, line 6 from bottom, *after* or *add* in.
Page 51, line 17, *for* J. S *read* S. J.
Page 56, line 24, *for* how *read* that.
Page 52, line 21, for *peteolaris* read *petiolaris.*
Page 58, line 16 from bottom, *for* decrepid *read* decrepit.
Page 61, line 18, *for* hypertrophized *read* hypertrophied.
Page 66, line 13, for *Cordifolio* read *Cordifolia.*
Page 67, line 27, *for* with *read* to.
Page 67, line 28, *after* and *add* to offer.
Page 83, line 13 from bottom, *for* who *read* as.
Page 85, line 17 from bottom, *after* fecundation *add* either the.
Page 85, line 18 from bottom, *strike out* either *and after female add* would.
Page 86, line 2 from bottom, for *and* read *und.*
Page 90, line 17, *for* had *read* has.
Page 100, last line, add a comma *before* say.
Page 101, line 10, for *nole* read *noli.*
Page 103, line 9, for *Caryæ* read *caryæ.*
Page 113, line 40, *for* 19 *read* 41.
Page 115, *for* exerted *read* exserted.
Page 120, line 25, *for* regulary *read* regularly.
Page 126, line 4 in note, for *querciti* read *quercoeti.*
Page 126, line 5 in note, for *pithicium* read *pithecium.*
Page 129, line 14, *omit* color of the.
Page 139, *for* Papineau *read* Popenoe.
Pages 140 and 141, wherever *Belvosia* occurs read *Belvoisia.*
Page 156, line 6, *for* consumes *read* has consumed.

REPORT VI.

Page 8, last line, *for* 1874 *read* 1873.
Page 12, line 13, for *Sisimbrium* read *Sisymbrium.*
Page 12, line 25, for *osciamus* read *oscyamus.*
Page 12, lines 13, 14, for *Poligonum* read *Polygonum.*
Page 27, line 2 from bottom, for *pecorus* read *pecoris.*
Page 27, line 15 from bottom, for *vireus* read *virens.*
Page 28, last line, for XV read XVI.
Page 35, line 3, *for* three *read* four.
Page 37, line 16, *for first* by *read* be.
Page 42, line 11, *for* the *read* certain.
Page 43, line 26, *strike out* to be presently treated of.
Page 47, remove "Telegraph" from "Summer grape" § to that of "Northern Fox."
Page 51, line 7 from bottom, for *insidious* read *insidiosus.*
Page 53, line 18, *for* Maguin *read* Mégnin.
Page 82, line 5 from bottom, *for* New *read* West.
Page 87, line 3 from bottom, for *Bignonio* read *Bignonia.*
Page 92, line 6, for *Callimorpa* read *Callimorpha.*
Page 94, line 14 from bottom, *for* point *read* joint.
Page 100, line 31, omit comma after *lardarius.*

Page 108, line 28, *for* orage *read* orange.
Page 111, line 6, for *perspicillata* read *tripunctata.*
Page 118, last line, for *Phytopoga* read *Phytophaga.*
Page 136, line 15, *for* Rosel von Rösenhof *read* Rösel von Rosenhof.
Page 141, line 9, *after* found *add* that.
Page 150, line 9, *for* pictures of *read* imprints on.
Page 154, line 6, strike out †.
Page 154, line 16, *for* it is *read* they are.
Page 156, line 8, *after* and *add* more.
Page 162, line 10, *for* elytram *read* elytrum.

REPORT VII.

Page IV, line 9, *for* contemptibly *read* contemptuously.
Page 1, line 10, *after* and *read* invaded the.
Page 5, line 16, *for* State *read* state.
Page 7, line 7, *for* calubrine *read* colubrine.
Page 11, line 32, *for* stoma *read* stomata.
Page 11, line 33, *for* dilutent *read* diluent.
Page 11, line 37, for J read S.
Page 12, line 13, for W. K read R. C.
Page 17, last line, for *Dep. de l'Hèrault* read *Dép. de l'Hérault.*
Page 21, line 14 from bottom, for LENCOPTERUS read LEUCOPTERUS.
Page 39, under Fig. 6, for TTIM read TRIM.
Page 52, line 14, *for* McWallie read McNallie.
Page 52, line 46, *for* Princeton read Purinton.
Page 75, line 32, *for* breed *read* bred.
Page 80, line 7 from bottom, add a comma before and after *pometaria.*
Page 81, last line, *for* nidi *read* nidus.
Page 94, in the sub-head, for GALL-INHABITING read ROOT-INHABITING.
Page 99, line 7, in note, *for* nerves *read* tracheæ.
Page 108, line 17, *for* two *read* too.
Page 117, line 15, *for* V *read* IV.
Page 118, line 17 from bottom, *for* hight *read* height.
Page 147, line 20, *for* 1873 *read* 1866.
Page 162, line 20, *for* larva *read* lava.

REPORT VIII.

Page III, line 13 from bottom, add 1 before the 3.
Page 7, line 26, *for* copper *read* soda.
Page 22, in notes, transpose the * and †.
Page 34, line 6, for *tulièles* read *tuélites.*
Page 34, line 11, *for* three-hundredths *read* two-hundredths.
Page 37, under Fig. 23, *for* exerted *read* exserted.
Page 38, line 6, *for* glass *read* grass.
Page 52, line 1 in note, for *Doliconyx* read *Dolichonyx,* and for *orizivora* read *oryzivora.*
Page 53, line 32, for *veridascens* read *viridascens.*
Page 98, second line, in explanation of Fig., for *e* read *c* and for *c* read *e.*
Page 100, line 2, *after* they *add* are still imperceptible; in the third stage (after second molt) they.
Page 100, line 4, *for* third *read* fourth, and *for* second *read* third.
Page 100, line 7, *for* fourth *read* fifth, and *for* third *read* fourth.
Page 100, line 8, *for* fourth *read* fifth and *for* fifth *read* sixth.
Page 114, line 7 from bottom, *for* distingulsh *read* distinguish.

Page 115, line 5, *after* histories *add* a comma.
Page 115, line 5 from bottom, for *Pesotettix* read *Pezotettix.*
Page 121, line 18, *after* limbs *add* and.
Page 149, under Fig. 46, *for* larva *read* pupa.
Page 150, line 10, for *gran* read *granu.*
Page 154, line 4 from bottom, *for* sheli *read* shell.

REPORT IX.

Page 6, line 26, insert after "moth" (*Euphanessa mendica,* Walk.).
Page 15, line 3, *for* entite *read* entire.
Page 29, in explanation of cut, *for* Abbott's *read* Abbot's.
Page 50, explanation of cut, for *e* read *c.*
Page 50, line 3 from bottom, *for* Hubner *read* Hübner.
Page 54, last line, in place of the comma, *write* is.
Page 55, line 1, *for* the other *read* the second.
Page 55, line 9 from bottom, *for* m. m *read* mm.
Page 55, line 7 from bottom, *strike out the* on.
Page 56, line 1, *for* m. m *read* mm.
Page 56, line 2, *for the last* and *read* anal.
Page 56, line 32, commence a new ¶ with "Chrysalis" and italicize it.
Page 57, in the heading for *Spretus* read *spretus.*
Page 58, line 14, *strike out* have.
Page 87, strike out the *g* in line 17 and also in figure.
Page 89, line 13, *strike out the* i *after* embryon.
Page 90, last line, for *ambion* read *amnion.*
Page 98, line 11 from bottom, for *Compoplex* read *Campoplex.*
Page 98, line 6, *add a comma before* De Geer.
Page 98, note *, for *Bastardii* read *Bastardi.*
Page 98, under Fig. 28, for BASTARDII read BASTARDI.

NOTES AND ADDITIONS.

Under this head it is not my purpose to publish the many additional notes of observations which have been made by myself and others on the various insects treated of in the reports; but rather to indicate a few of the more important facts, especially such as are unpublished and bear on life-histories left incomplete. As, in preparing the reports, the older and better known generic nomenclature was almost uniformly employed, it is thought advisable to indicate in this bulletin the more recent nomenclature, and this is accordingly done either in these "Notes" or in connection with the reproduced "Descriptions of New Species" which follow:

HYMENOPTERA.

STIZUS GRANDIS Say (Rep. I, p. 27, Fig. 12)—This has been shown by Mr. W. H. Patton (Bull. U. S. Geol.-Geog. Survey, vol. V, p. 342) to be only a variety of *speciosus* Drury, which is the type of the genus *Sphecius* Dahlb.

CRYPTUS EXTREMATIS Cress. (Rep. IV, p. 111)—The questions in regard to the character of *C. samiae* Pack. have been settled by Dr. Hagen from an examination of the types (Bull. Buff. Soc. Nat. Sci., II, 206; 1875) confirming the conclusion which I came to. In Bulletin No. 3 of the Commission (p. 47) I have suggested that *extrematis* should sink as a synonym of *samiæ*, because two species (one of which is *nuncius*) were combined under it in the original description.

MICROGASTER MILITARIS Walsh (Rep. I, p. 89 and subsequently)—This is an *Apanteles* (See my Notes on N. A. Microgasters, etc. (Extr. from Trans. St. Louis Ac. Sc. IV), p. 19.)

ANTIGASTER MIRABILIS Walsh (Rep. VI, p. 162)—Mr. L. O. Howard has shown (*Can. Ent.* October, 1880. p. 209, and February, 1881, p. 31) that the habit of rolling back is not uncommon in the *Eupelmides*, and that *Antigaster* cannot well be separated from *Eupelmus* as at present understood.

COLEOPTERA.

CARABID LARVÆ (Rep. IX, p. 97)—The second larva mentioned on this page was subsequently reared by me to the perfect state and proved to be *Amara obesa* Say. It will be found figured and described in the First Report of the Commission (p. 290).

LEBIA GRANDIS, Hentz (Rep. III, p. 100)—This belongs to Chaudoir's genus *Loxopeza*.

LEBIA ATRIVENTRIS Say (Rep. VIII, p. 3)—Belongs to Chaudoir's genus *Loxopeza*.

HIPPODAMIA MACULATA, DeGeer (Rep. I, p. 112 and subsequently)—Now referred to Mulsant's genus *Megilla*. It does not appear that this species occurs also in Europe as stated in the text.

COCCINELLA MUNDA Say (Rep. II, p. 25)—This is now considered synonymous with *Cycloneda sanguinea* Linn.

COCCINELLA PICTA Randall (Rep. V, p. 101)—Now known as *Harmonia picta*.

MYSIA 15-PUNCTATA, Oliv. (Rep. IV, p. 18)—This has been referred to the genus *Anatis*, Mulsant.

LACHNOSTERA QUERCINA, Knoch. (Rep. 1, p. 156)—This is synonymous with *fusca* Fröhlich, which has priority. The fungus affecting it (p. 158 and Rep. 6, p. 125) is *Cordyceps ravenelii* Berkeley. (See *American Entomologist*, III, p. 139.)

CHAULIOGNATHUS PENNSYLVANICUS, De Geer (Rep. I, p. 57 and subsequently)—This is now known as *Ch. americanus* Forst., the latter name having priority. For an account of the eggs and young larvæ, see Second Report of the Commission, p. 261.

SAPERDA BIVITTATA Say (Rep. I, p. 42)—This is now admitted to be a synonym of *candida* Fabr. For a correct description of the eggs and mode of oviposition, see an article by me in New York Weekly *Tribune*, Feb. 20, 1878.

BRUCHUS PISI Linn. (Rep. III, p. 44)—This name of the 12th edition of Linnaeus's "Systema Naturæ" gives way in modern catalogues to *pisorum* L. of the 10th edition.

FIDIA VITICIDA Walsh (Rep. I, p. 32)—This species is not mentioned by Crotch in his "Materials for the Study of the Phytophaga of the U. S." (Proc. Ac. Nat. Sc. Phil., 1873), but his *Fidia murina* (l. c. p. 33) is undoubtedly synonymous with Walsh's *viticida*, the latter name having priority by several years. In Crotch's "Check list" this species is also omitted, but the *Fidia vitis* Walsh in the "Omissions" to that list (p. 127) is probably meant for *viticida*.

HALTICA CHALYBEA, Illiger (Rep. III, p. 79)—This belongs to the genus *Graptodera* Chevr.

HALTICA CUCUMERIS Harris (Rep. I, p. 101)—This is now referred to the genus *Epitrix*, Foudras.

PHYSONOTA QUINQUEPUNCTATA Walsh & Riley (Rep. II, p. 59)—This is synonymous with *Ph. unipunctata* (Say), there being no question as to the specific identity of the two, both having been bred by Mr. F. H. Chittenden, of Ithaca, N. Y., from larvæ on a wild sun-flower (*Helianthus*).

CASSIDA NIGRIPES Oliv. (Rep. II, p. 63)—The eggs of this species are much like those of *aurichalcea* (Rep. II, Fig. 31) in size, form and color, though the spine-like appendages break off more easily. They may, however, be distinguished by being larger (1.6^{mm} long without projections), having, in fact, nearly double the bulk, and by the flat posteriorly projecting piece which bears the spine-like appendages being generally greatly developed so as sometimes to extend beyond the apex fully one-third the length of the whole egg. Sometimes this piece divides distinctly into three spines, but in other cases it is quite blunt.

CASSIDA BIVITTATA Say (Rep. II, p. 61)—The eggs of this species are pale and ovoid, just 1^{mm} long, but invariably covered with a yellowish secretion which dries and spreads out each side, and this by a black excrementitious material which gives the egg from above the appearance of an ovoid bit of excrement flattened on the adhering side. The eggs are laid singly or in twos or threes.

CASSIDA AURICHALCEA Fabr. (Rep. II, p. 62)—This is now referred to the genus *Coptocycla* Chevr.

CASSIDA PALLIDA Herbst (Rep. II p. 62)—This is now recognized as a synonym of *Coptocycla aurichalcea* (Fabr.).

COPTOCYCLA GUTTATA, Oliv. (Rep. II, p. 63)—The eggs of this species, which I have often since observed, are deposited singly or in twos, threes or fours. They are rather more than 1^{mm} long, of the same general form and character as those of *Cassida bivittata*, but more narrow and elongate. The color is pale yellowish and translucent. The egg is always covered with a viscid fluid which dries to form a transparent covering verging to fulvous or gamboge in color. This covering almost always spreads out on each side of the egg in ray-like ridges, those on each side parallel and slightly oblique, and whenever the egg is single these ridges are remarkably regular and have a neat appearance. There is occasionally on the top of this a varying amount of ex-

crement. The structure of the covering is similar to that found in the egg of *Cassida texana* Cr. (which feeds on *Solanum eleagnifolium*), where, however, the ribs are finer and transverse, and there is no excrementitious covering. The newly hatched larva of *guttata*, like that of the other species is whitish, strongly recalling in general appearance an ordinary mite, the head not being concealed as it subsequently is, the hairs at the tip of the legs being frequently clavate or knobbed, and resembling those on the young of many Coccids. The marginal spines and the anal fork are quite well developed but simpler than in the subsequent larval stages. This newly hatched larva is quite nimble and crawls easily over glass.

DELOYALA CLAVATA, Oliv. (Rep. II, p. 56)—Now referred to the genus *Coptocycla.*

BLISTER-BEETLES (Rep. 1, p. 96 *ff.*)—The larvæ feed on locust eggs. For account of their larval economy see my paper "On the larval Characters and Habits of the Blister-beetles," etc., Trans. Ac. Sc. St. Louis III, p. 544 ff.: also Reports of the Commission I, p. 292 ff.; II, 262 ff. Remarks on synonymy are also there given, but the following may be repeated.

LYTTA CINEREA Fabr. (Rep. I, p. 97)—This is now known as *Macrobasis unicolor* (Kirby).

LYTTA MURINA Lec. (Rep. I, p. 98)—This is a color variety of *Macrobasis unicolor.*

LYTTA MARGINATA Fabr. (Rep. I, p. 98)—This is believed by Horn to be a color-variety of *Epicauta cinerea* (Forst.).

LYTTA ATRATA Fabr. (Rep. I, p. 98)—This is the *Epicauta pensylvanica* (De Geer) of Crotch's List.

ANTHONOMUS PRUNICIDA, Walsh. (Rep. III, p. 39)—Upon this species, which is a synonym of *scutellaris* Lec., Dr. Leconte has since founded the genus *Coccotorus* (Proc. Am. Philos. Soc. vol. XV, 1876, p. 193).

CONOTRACHELUS NENUPHAR, Hbst. (Rep. III, p. 127, note)—The phytophagic variety of this species from Walnut and Butternut has since been characterized by Dr. Leconte as a distinct species, *C. juglandis* (Proc. Am. Philos. Soc. vol. XV, p. 226).

CŒLIODES INÆQUALIS, Say (Rep. I, p. 128)—Dr. Leconte has since founded upon this species the genus *Craponius* (Proc. Am. Philos. Soc. vol. XV, 1876, p. 268). The egg of this snout-beetle is quite large, bright yellow in color and deposited in a cavity half as large as the beetle, though the puncture leading to it is small. The lateral angularities or tubercles of the joints, as described by Walsh, are quite characteristic, and the dorsal view in my figure, given to show them, conveys a somewhat false impression of the larva, which is more or less curved, and has the general characteristics of Curculionid larvæ. The figure is rather more attenuated than it should be. That the beetle hibernates I have since proved beyond question.

BARIDIUS TRINOTATUS Say (Rep. I, p. 93)—Dr. Leconte (Proc. Am. Philos. Soc. XV, 1876, p. 287) has since established for this and two allied species the genus *Trichobaris.*

SPHENOPHORUS ZEÆ Walsh (Rep. III, p. 59)—This has been previously described by Mr. Uhler as *S. sculptilis* (Proc. Ac. Phil. VII, 1855, p. 416).

SPHENOPHORUS PULCHELLUS Schœnherr (Rep. III, p. 60)—As intimated in the footnote on the same page, this species is synonymous with Say's *S.* 13-*punctatus*, for which species and for *Sphenophorus pustulosus* Gyllh. Dr. Leconte has established the genus *Rhodobænus* (Proc. Am. Philos. Soc. vol. XV, 1876, p. 332). I have reared both, and also intermediate forms, from Helianthus in Texas, and Ambrosia in Missouri.

SCOLYTUS CARYÆ Riley (Rep. V, p. 107)—Dr. Leconte (Proc. Am. Phil. Soc. XV, 1876, p. 371) has since decided that 4-*spinosus* Say is the ♂ of this species, and Say's name consequently obtains.

LEPIDOPTERA.

PAPILIO PHILENOR Drury (Rep. II, p. 116)—Referred by Scudder to Hübner's genus *Laërtias.* For further notes and description of the egg and young larva, see *Canadian Entomologist*, January, 1881, p. 9, and *American Naturalist*, April, 1881, p. 327.

DANAIS ARCHIPPUS, Fabr. (Rep. III, p. 143)—For further facts respecting the swarming and migrations of this butterfly, see the *American Entomologist* (III, p 101), and for a fuller and more accurate account of the mode of pupation, see my paper on the "Philosophy of the Pupation of Butterflies and particularly of the Nymphalidæ" (Proc. Am. Ass. Adv. Sc. vol. XXVIII, 1880).

ÆGERIA ACERNI, Clem. (Rep. VI, p. 110)—Mr. D. S. Kellicott has an interesting article in the *Canadian Entomologist* for January, 1881, on the Ægerians inhabiting the vicinity of Buffalo, N. Y., in which he states that the chrysalis of this species in his locality does not agree with my description as "unarmed," if that description refers to the dorso-abdominal teeth. A reëxamination of my specimens shows that my statement applies to the absence of these teeth. It is, however, possible that there is some variation in this regard and that the eastern specimens from the Hard maple differ from the western ones from the Soft maple in having the teeth as indicated by Mr. Kellicott.

ARCTIA ISABELLA, Smith (Rep. IV, p. 143)—Referred to *Pyrrharctia* Packard. For further account of larval variation and parasites, see *American Entomologist*, III, p. 134 (June, 1880).

HYPHANTRIA TEXTOR Harr. (Rep. III, 130)—There is no doubt in my mind, from frequent breeding of specimens, that this is synonymous with *cunea* Drury and *punctata* Fitch, which are but varieties, Drury's name having priority.

CALLIMORPHA FULVICOSTA, Clem. (Rep. III, 132)—Grote and Robinson give the synonymy of this species in their "List of Lepidoptera of N. A.," etc., *lecontei* Boisd. having priority. The late Jacob Boll bred all the forms from larvæ feeding on the same species of plant.

SAMIA COLUMBIA Smith (Rep. IV, p. 107)—Mr. Herman Strecker has given a beautiful figure of the male of this species in his "Lepidoptera Rhopaloceres and Heteroceres, etc.," 1875 (Pl. XII, Fig. 3), and Mr. F. B. Caulfield has described and figured the larva (*Canadian Entomologist*, X, p. 41, 1878) showing that it is structurally identical with that of *cecropia* and differs only in the intenser green of the body, in the lateral tubercles and bases of the others being white instead of pale blue and in the upper thoracic tubercles being of a deeper coral-red. It accords more with the *cecropia* larva in the fourth stage. It is placed as a good species in Grote's "List of N. A. Platyptericeş," etc. (Am. Phil. Soc., 1874), but I am still of opinion that it should not be considered a distinct species but simply a well-marked local color-variety worthy of name. There is great variation in color, whether of the larva, cocoon or imago, in *cecropia*.

CALLOSAMIA ANGULIFERA, Walker (Rep. IV, p. 122, note)—This is still considered a good species by systematists. Mr. Jno. Akhurst, of Brooklyn, N. Y., informs me that he finds it rather constant from larvæ which seem to differ in no respect from those of *promethea*, but which feed on the Tulip tree (*Liriodendron tulipifera*), and make the cocoon near the ground without pedicel. I learn from Dr. Packard that Mr. Uhler has bred both it and *promethia* from the same lot of larvæ.

CLISIOCAMPA SYLVATICA Harr. (Rep. III, 121)—This is now referred to *disstria* Hübn., which has priority.

AGROTIS INERMIS Harr. (Rep. I, p. 72)—This is now recognized to be identical with the European *A. saucia* Treitschke.

NOCTUA CLANDESTINA Harr. (Rep. I, p 79)—An *Agrotis*.

AGROTIS TELIFERA Harr. (Rep. I, p. 80)—This is now recognized as the European *A. ypsilon* Hüfn. = *A. suffusa* (S. V.) = *A. ortonii* Pack.

AGROTIS SUBGOTHICA Harr. (Rep. I, p. 81)—The moth represented under this name at Fig. 29, *a*, has since been described by Grote as *A. herilis*, and that at Fig. 29, *b*, has since been described by Lintner as *A. tricosa*. (Notes on some N. Y. Noctuidæ, Ent. Cont. III in Rep. N. Y. St. Mus. Nat. Hist., 1872, p. 159.)

AGROTIS JACULIFERA Guen. (Rep. I, p. 82)—This is the true *subgothica* of Haw. (See Grote, List of Noctuidæ of N. A., Bulletin Buffalo Soc. Nat. Sc. II, 1874, and Lintner *l. c.*)

AGROTIS DEVASTATOR, Brace (Rep. I, p. 83)—Grote refers it to *Hadena.*

CELÆNA RENIGERA Stephens (Rep. I, p. 86)—Referred by Grote to *Hadena.* Specimens in the Fitch collection marked with names (evidently from Walker) *infecta, egens, defectua, subcadens* ? and *murcimaculata* seem to be all synonyms and mere variations.

PRODENIA AUTUMNALIS Riley (Rep. III, p. 116 and subsequently)—As stated in the 8th Report (p. 48) this in the more typical form is recognized as *Laphygma frugiperda,* Sm. & Abb. The variety *obscura,* as Prof. Zeller, who has seen it, informs me is so near the European *exigua* Hübn. that it is not easily distinguished.

PRODENIA COMMELINÆ, Sm. & Abb. (Rep. I, p. 88, and III, p. 113)—Dr. Leon F. Harvey (Bull. Buff. Soc. Nat. Sci., vol. II, pp. 274, 275; 1875) has since proposed specific names for two of the forms hitherto considered to be but varieties of *commelinæ.* The moth represented at Fig. 48, *c,* of the Third Report, is named by him *flavimedia,* that at Fig. 48, *b, lineatella,* the true *commelinæ,* being a larger species. From larvæ with the series of black triangles bordered exteriorly by a yellow line (such as are represented on Plate I, Fig. 12 of Rep. I, and at Fig. 48 *a* of Rep. III) I have bred the *flavimedia.* But larvæ found on cotton in the Southern States, and differing in having black triangles on the second joint only, and also varying greatly in coloration, have produced the same moth. Abbot's figure of the larva of *commelinæ* shows the full series of black triangles, but without any yellow exterior line.

GORTYNA NITELA Guen. (Rep. I, p. 92)—I have proved by breeding that *G. nebris* Gn. is but a large, southern form of this species. In the Southern States it is most common in stems of *Ambrosia trifida,* often producing a swelling or pseudo-gall. Both forms are indiscriminately bred with intermediate variations. See an article by Miss E. A. Smith (7th Report on the insects of Illinois, Cyrus Thomas, pp. 112–114) for additional food-plants and the habit of the younger larvæ to infest wheat-stalks, corn, etc. See also Am. Ent. I, p. 252; my "Potato Pests" (Orange, Judd & Co., 1877, p. 91) and *Prairie Farmer,* August 11, 1877. The insect normally pupates in the stem and when infesting thin stalks like those of most cereals and blue-grass (in which it is also found) often of necessity leaves one stalk for another.

ANOMIS XYLINA, Say (Rep. II, p. 37; VI, 17)—This has since been referred by Grote to Hübner's *Aletia argillacea,* which has been generally adopted. See Bulletin 3 of the Commission on the Cotton Worm. While it will doubtless be found convenient in future to separate it from the other species of the genus *Anomis,* and Hübner's generic name may therefore obtain, I must confess, after a careful examination of Hübner's figure of *argillacea,* to grave doubts as to the correctness of Grote's reference thereto of our Cotton-worm Moth (*xylina,* Say). Hübner's figure lacks several of the most constant characteristics of *xylina.* It is fulvo-testaceous shaded with brown, with the under side bright yellow. It lacks the three white specks on primaries and has a dark (orbicular?) spot in place of the outer one. It has a large white circular spot with black annulus in place of the dusky elongate discal spot with its double pupil. The wavy lines are almost black and differ in form; the fringes are unicolorous, and the abdomen is narrower. The figure more nearly represents in fact a species which I have received from Bahia, Brazil, and which differs from *xylina,* though the larva (also quite different) feeds on cotton.

We are all inclined to follow determinations of those who make a specialty of any group, but after due allowance for faulty coloring in Hiibner's figure, I am constrained to believe that in this instance Mr. Grote has been in fault.

CANKER-WORMS (Rep. VIII, p. 12)—For additional remarks as to the generic characters of the two Canker-worms, see my paper "On the differences between *Anisopteryx pometaria* Harr. and *Anisopteryx æscularia* W. V., with remarks on the genus *Paleacrita.* (Trans. Ac. Sc. St. Louis, Vol. III, p. 573 ff.)

GALLEREA CEREANA, L. (Rep. I, p. 166)—This is the *mellonella* L. of the 10th edition Syst. Naturæ.

PEMPELIA GROSSULARIÆ Packard (Rep. I, p. 140)—The European *Zophodia convolutella* Hübn. (*Phycis grossulariella* Treitschke), which has precisely similar habits, closely resembles this species. In 1871 I compared it with this last in Mr. Stainton's collection and with specimens received from Prof. Zeller and could detect no essential differences. The European specimens are slightly larger, with broader wings and usually clearer, paler gray coloring. Colorational markings are, however, very variable in specimens from both sides of the Atlantic.

P. grossulariæ Packard was subsequently described by Grote as *Dakruma turbatella* (Bull. U. S. Geol.-Geog. Survey, IV, No. 3, p. 702; 1878). *Dakruma* seems to differ from *Zophodia* in nothing but the absence of the basal portion of the subcostal vein and possibly, although this character is not mentioned by Grote, in the recurved palpi. According to the synoptical table given by Heinemann, *grossulariæ* would fall in the genus *Stenoptycha*, distinguished from *Zophodia* by the recurved palpi. We may well question the generic value of this character, for different authors describe it quite differently: thus, Heinemann describes the palpi of *Stenoptycha* and *Homeosoma* as recurved, whereas Grote describes them as porrect in these two genera, if we accept his statement that *Honora* Grote is to be considered a section of *Stenoptycha:* there appears also to be a difference in position in specimens of the same species, according as the palpi are heavily scaled or have lost the scales. From the known individual variation in the venation of these and other moths, especially in the hind wings, we cannot attach any specific, much less any generic, value to the slight difference in the subcostal vein of *Dakruma* noted above. Moreover, authentic specimens of *grossulariæ* do not appear to possess this character of *Dakruma.* I am, therefore, of opinion that a study of sufficient material from both continents will prove the two specifically identical, or at the most that our American insect is a variety, and that *Dakruma* will not obtain. Packard is of this opinion, as in the later editions of his *Guide* the species is called *Myelois convolutella.*

PENTHINA VITIVORANA Packard (Rep. I, p. 133)—This is identical with a European insect having the same habits. It was first described over a century since by Schiffermiller & Denis as *Tortrix botrana*, and has been referred to various genera since, and finally to *Eudemis* Hübn., so that the insect should be known as *Eudemis botrana* (Schiff.). *Conchylis ambiguella* (Hübn.) has very similar habits in Europe. See Nördlinger's "Die Kleinen Feinde der Landwirthschaft," p 424 ff. It is the *Lobesia botrana* of the later editions of Packard's *Guide.*

EURYPTYCHIA SALIGNEANA Clem. (Rep. II, 134).—This according to Prof. Fernald, who has seen the type, is the same as Clemens's *Hedya scudderiana* (Proc. Acad. Sci. Phila., 1860, p. 358), the description of which is very brief and presumably taken from a female. The genus *Euryptychia* (Proc. Ent. Soc. Phila. V, 140) is founded on the male, which has a broad fold extending to the middle of costa on the primaries and covering up a pencil of yellowish hairs. Zeller subsequently redescribed it as *Pædisca affusana* (Beiträge, etc., pt. III, p. 101 [307]). From a comparison of female specimens I am led to believe that this is the same species that is commonly known in Europe as *Spilonota roborana* Schiff., though in Staudinger and Wocke's Catalogue *cynosbana* Fabr., described in 1875, is given the priority and *aquana* Hübn. is placed as a synonym. The obliquity of the edge of the basal dark patch and the details of the ocellated spot upon which species have been separated, I find to be variable.

The insect in Europe is known to feed on the leaf-buds of the rose. I have abundant proof that in this country it is not a gall-maker, but, as was inferred in the Report, an inquiline. I have found its larva feeding upon the flowers as well as amid the terminal leaves of the Golden-rod, and have also found it in other galls. When feeding in the more exposed positions it generally has a carneous or rosy tint.

ANCHYLOPERA FRAGARIÆ W. & R. (Rep. I, 142)—This has been referred to *Phoxopteris comptana* Fröhl., and while the two very closely resemble each other Prof. Fernald informs me that he yet believes *fragariæ* to be distinct.

ŒTA COMPTA, Clem. (Rep. I, p. 151)—Notwithstanding Mr. Grote doubts the identity of this insect with Cramer's *Phalæna punctella*, there is no question in my mind about it, and I entirely agree with Zeller, who makes also the *Tinea pustulella* Fabr. a synonym (Beitr. z. Kenntn. N. A. Nachfalter II, p. 28). It was first described in this country in 1856 by Fitch as *Deiopeia aurea* (3rd Rep. Ins. N. Y., p. 168.) See also "Zygænidæ and Bombycidæ of N. A." by R. H. Stretch, 1872, pp. 159 and 241.

The egg of this insect is one of the most singular Lepidopterous eggs with which I am familiar. I have found it numerously in the South in midsummer. It is 0.9^{mm} long, soft and plastic so as to be variable in form; but when laid (as it often is) on the web which the young larvæ make, where it takes on the more natural form, it is ovoid, somewhat compressed, with frequently a median ridge and one end narrowed and produced into a short neck. The color is cream-yellow and the delicate shell is corrugulate. It is laid singly and generally slightly attached by the broad side to the side of the mid-rib of the tenderest leaves, and its contact (by virtue, doubtless, of some poisonous liquid with which it is laid) causes a well defined swelling of the leaf-vein.

The species is placed among the *Zygænidæ* in Grote and Robinson's *List*, and has evidently more affinities therewith than with the *Teneidæ*.

PRONUBA YUCCASELLA Riley (Rep. V, p. 150 and subsequently)—For further facts regarding this species, see my papers in Trans. St. Louis Ac. Sc. III, p. 568; *American Entomologist* III, pp. 141, 182, 293, and also a paper read before the American Association for the Advancement of Science at Boston, Aug., 1880, and to be published in the Proceedings of the Association for that year.

PTEROPHORUS PERISCELIDACTYLUS (Rep. III, p. 65)—This belongs to the genus *Oxyptilus*, Zeller.

HETEROPTERA.

ARMA SPINOSA Dallas (Rep. II, p. 113 and subsequently)—Now referred to Stål's genus *Podisus*.

EUSCHISTUS PUNCTIPES, Say (Rep. IV, p. 19 and subsequently)—This is now known as *Euschistus variolarius* Beauv., this last having priority over Say's name.

COREUS TRISTIS, De Geer (Rep. I, p. 113 and subsequently)—Belongs to Amyot & Serville's genus *Anasa*.

MICROPUS LEUCOPTERUS, Say (Rep. II, p. 15 and subsequently)—Now referred to Burmeister's genus *Blissus*.

ANTHOCORIS INSIDIOSUS, Say (Rep. II, p. 27 and subsequently)—Belongs to Fieber's genus *Triphleps*.

REDUVIUS RAPTATORIUS Say (Rep. I, p. 114)—Belongs to *Sinea*, Amyot & Serv., and is synonymous with *diadema* Fabr.

HARPACTOR CINCTUS Fabr. (Rep. I, p. 114 and subsequently)—Belongs to Stål's genus *Milyas*.

HOMOPTERA.

CICADA SEPTEMDECIM (Rep. I, p. 18)—This orthography, used in the Reports, is grammatically correct, but I find that Linnæus himself wrote *septendecim* (Systema Naturæ, Tom I, Pars II, 12th Ed. Stockholm 1767). Fitch used both forms of spelling, but Westwood, Harris and most other authors follow Linnæus, and *septendecim* is, therefore, preferable. As to whether the 17 and 13-year broods should be considered specifically distinct, I am still of the opinion expressed in the First Report that the insects should not be looked upon as distinct species, but that *tredecim* Riley should rather be considered a race, or as Walsh (in a letter to Charles Darwin, which has kindly been shown me by Mr. G. H. Darwin) puts it, an incipient species, to which, for convenience, it is desirable to give a distinctive name. That it may be looked upon as a good species by excellent authority, will be seen by Walsh's discussion of the subject (*American Entomologist* II, p. 335) which I here quote:

What candid entomologist, who has worked much upon any particular order, will not allow that there are certain genera where it is often or almost or quite impossible

to distinguish species by the mere comparison of cabinet specimens of the imago? Lœw and Osten Sacken have said this of the genus *Cecidomyia* in Diptera; Osten Sacken of two other Dipterous genera, *Sciara* and *Ceratopogon;* Norton of the genus *Nematus* in Hymenoptera; and Dr. Le Conte lately assured me that, although when he was a young man he thought himself able to discriminate, in the closet, between the different species of *Brachinus* in Coleoptera, he now considered it quite impracticable to do so with any degree of certainty. And yet who doubts the fact of the existence, in North America, of very numerous distinct species of *Cecidomyia*, of *Sciara*, of *Ceratopogon*, of *Nematus*, and of *Brachinus*.

Upon the same principle I strongly incline to believe that the 17-year form of the Periodical Cicada (*C. septemdecim*, Linn.) is a distinct species from the 13-year form (*C. tredecim*, Riley) although it has been impossible for me, on the closest examination of very numerous specimens, to detect any specific difference between these two forms.* It is very true that the 13-year form is confined to the more southerly regions of the United States, while the 17-year form is generally, but not universally, peculiar to the Northern States; whence it has been, with some show of plausibility, inferred that the 13-year form is nothing but the 17-year form accelerated in its metamorphosis by the influence of a hot southern climate. But as these two forms interlock and overlap each other in various localities, and as it frequently happens that particular broods of the two forms come out in the same year, we should certainly expect that, if the two forms belonged to the same species, they would occasionally intercross, whence would arise an intermediate variety having a periodic time of 14, 15 or 16 years. As this does not appear to have taken place, but, on the contrary, there is a pretty sharp dividing line between the habits of the two forms, without any intermediate grades of any consequence, I infer that the internal organization of the two forms must be distinct, although externally, when placed side by side, they are exactly alike. Otherwise, what possible reason could there be for one and the same species to lie underground in the larva state for nearly 17 years in one county, and in the next adjoining county to lie underground in the larva state for scarcely 13 years? I presume that even the most bigoted believer in the old theory of species would allow that, if it can once be proved to his satisfaction that two apparently identical forms are always structurally distinct, whether in their external or in their internal organization, they must necessarily be distinct species.

On the other hand, I firmly believe that many perfectly distinct forms, which at one time passed current, or which even now pass current, as true species, are in reality mere dimorphous forms of one and the same species. We find a good example of this in the dimorphous ♀ *Cynips, q. aciculata*, O. S., which has already been treated of at great length. We find another good example of the same thing in *Cicada Cassinii* ♂ ♀, Fisher, which is sufficiently distinct from the Periodical Cicada to have been classified as a distinct species, and yet never occurs except in the same year and in the same locality as this last, and what is more extraordinary still, is found not only along with the 17-year form (*C. septemdecim*), but also along with the 13-year form (*C. tredecim*).

Now, if *Cassinii* were a distinct species, and not, as I believe it to be, a mere dimorphous form of *C. septemdecim* and *C. tredecim*, the chances are more than a million millions to one against its always coinciding with the two other forms, not only as to the particular locality but as to the particular year of its appearance.

I do not know that any one has heretofore attempted to set at rest, by actual proof, the very general skepticism as to this insect remaining so long underground, on the part of those persons who have given little attention to the subject. I have been able to trace the development from year to year of my *tredecim* brood *XVIII* in the vicinity of Saint Louis by digging up the larvæ each year from 1868 to 1876, and noting the annual growth. They could always be found within from two to five feet of the surface upon the roots of trees, and had by the 8th year attained the first pupa stage, and I have no doubt but that, at this writing, the true pupæ are nearing the surface of the ground to appear in myriads in the perfect state in May and June of this year.

The fungus affecting this Cicada has since been described by Mr. C. H. Peck as *Massospora cicadina* (31st Rep. N. Y. State Mus. Nat. Hist., pp. 44, 1879).

ERIOSOMA PYRI, Fitch (Rep. I, p. 118) — After comparing specimens in Europe with our American insect, I have no doubt of the specific identity of the two, or of the root-inhabiting and twig-inhabiting forms. The insect should be known, therefore, as *Schizoneura lanigera* (Hausm.). See my remarks in *American Entomologist*, II, 359;

*For an excellent statement of the facts bearing upon this curious question, see a paper by Mr. Riley, the State Entomologist of Missouri, in No. 4 of the American Entomologist, and a still more complete one in his First Annual Report.

Rep. 3, p 95, and "Notes on Aphididæ of the U. S." (Hayden's Bull. U. S. Geol. & Geogr. Surv. of Terr., Vol. V, p. 3).

ASPIDIOTUS HARRISII Walsh (Rep. I, p. 7)—This belongs to Costa's genus *Diaspis*, and is apparently the species named *ostreæformis* by Curtis (Gardener's Chronicle, 1843, p. 805).

DIPTERA.

TRUPANEA APIVORA Fitch (Rep. I, p. 168; II, 122)—This has been renamed *Promachus Fitchii* by Osten Sacken (Cat. of the described Diptera of N. A. 2nd Ed., 1878, p. 234), the species proving different from *Bastardii* Lœw, and Fitch's name being preoccupied.

BEE-FLY LARVA (Rep. IX, p. 96)—The undetermined larva here illustrated (Fig. 24) has since proved to be that of a *Systœchus*, a genus of Bombyliid flies. For further details and determinations see the Second Report of the Commission (pp. 262–9).

SARCOPHAGA CARNARIA, L. (Rep. IX, p. 95)—The variety *sarraceniæ* of this species there mentioned is now considered a good species, for reasons stated in Bulletin 3 of the Commission (pp. 39, 40, note).

EXORISTA LEUCANEÆ, Kirkpatrick (Rep. II, p. 50 and subsequently)—Referred to the genus *Nemoræa* Desv. by Osten Sacken (Catalogue, etc., 1878, p. 150). The variety *cecropiæ* of this (Rep. IV, p. 108) is quoted by him as a distinct species under *Exorista*, probably a mistake caused by my employing the wrong figure in the *American Entomologist*, Vol. II, p. 101, where that of *E. flavicauda* is used for *leucaniæ*.

LYDELLA DORYPHORÆ Riley (Rep. I, p. 111)—Now included in the genus *Exorista*.

ORTHOPTERA.

ŒCANTHUS NIVEUS, De Geer (Rep. I, p. 138, and V, p. 120)—This species is common in all parts of the country, and I have proved, by breeding, that its eggs are those described and figured as such in the 5th Report. I agree with Scudder in considering *fasciatus* De Geer but a dark and rather well marked variety of it. Its chirp is intermittent, resembling a shrill *te-reat te-reat te-reat* with a slight pause between each. The eggs and punctures figured on page 119 of the 5th Report (Fig. 47) as probably those of *Orocharis saltator* are, as I have since proved by breeding and by watching the process of oviposition, those of a large species of Œcanthus, hitherto, I believe, very generally confounded with *niveus*, and which is described below as *Œ. latipennis* N. Sp. While *niveus* punctures all kinds of soft stems and pithy twigs, *latipennis* seems to prefer the more slender parts of the Grape-vine. The female, when she has sufficiently proceeded in the act of ovipositing, is so intent that she can very well be watched at night by the aid of a "bull's-eye."

The jaws are first used to slightly tear the outer bark. With the antennæ stretched straight forward and the abdomen bent up so as to bring the ovipositor at right angles with the cane, she then commences drilling, working the abdomen convulsively up and down about twice each second. The eggs, as described in the Report, are laid lengthwise in the pith, but always in two sets, one each side of the hole. The number varies according to the size of the cane, and the distance between the holes is also variable but usually less than in my figure. The hole is usually filled up with a white mucous secretion, though there is very little of it about the eggs. This secretion also doubtless serves to facilitate the drilling. The same female will lay over 200 eggs, and will sometimes puncture the same cane at intervals of $\frac{1}{8}$ inch for $1\frac{1}{2}$ feet or more.

The shrill of *latipennis* is continuous and recalls the trilling of a high-pitched dog-whistle in the distance. The key varies, however, and is sometimes much less high and more musical than at others. The commingled shrill of this species recalls also the distant croaking of frogs in spring. The broad wings are thoroughly elevated during the act or even bent forward, and the vibration is so rapid that there appears

to be no motion. The species, in addition to these differences in stridulation and habits, may be distinguished from *niveus* by the following characters:

ŒCANTHUS LATIPENNIS N. Sp.—White, the elytra of the ♀ sometimes grayish and the posterior femora in one specimen discolored. Antennæ immaculate, with the basal joints and the front of head usually roseate. Tip of ovipositor black. Pronotum as in *niveus*. Hind wings ♀ as long at the elytra or sometimes a trifle longer; of ♂ somewhat shorter than elytra. Elytra of ♀ irregularly reticulate between the parallel oblique veins, especially toward the base. Elytra of ♂ when unfolded ⅔ as wide as long, the dorsal surface 14^{mm} to 16.5^{mm} long by 7^{mm} to 8^{mm} wide; the rasp 1.5^{mm} long and the teeth distinctly seen with a lens of low power. Ovipositor 6^{mm} long; subgenital plate broadly excavated. Claspers of ♂ with their tips broad, but slightly broader at base than at tip, not deeply separated.

Described from 15 ♂ ♀ specimens from Missouri, 1 ♂ from Alabama, and 1 ♂ from South Texas.

The form of the subgenital plate, the immaculate antennæ with their roseate base, and the larger size serve to distinguish the species as well in the pupa as in the imago state.

Œ. latipennis is a larger insect than *niveus* usually is. The ovipositor measures 6^{mm} in length, whereas in *niveus* it rarely exceeds 5^{mm} and in only one specimen, a sanguineous variety captured July 10, 1874, does it equal 6^{mm}. The male elytra of *niveus* in only one specimen, captured September 19, 1877, reach 13^{mm} in length by 6^{mm} in width on the upper face, and the size is generally much less. In *niveus* the unfolded male elytra are less than ⅔, and usually only ½, as wide as long, and the rasp is only 1^{mm} long, and the teeth are not so easily seen. The elytra of *niveus* female sometimes show an irregularity in the reticulation between the parallel oblique veins but never so great an irregularity as in *latipennis*, there being fewer cells. In only one specimen of *latipennis*, a male taken on cotton at Columbus, Tex., are there any black marks on the lower surface of the basal joints of the antennæ, representing the lines or dots which are always present in *niveus*. But the two species are most sharply separated by the form of the subgenital plate of the female, which in *niveus* narrows rapidly towards the tip which has a minute angular notch, and by the form of the male claspers, which in *niveus* have their tips very slender and parallel, being deeply parted, and then retreating rapidly from one another on each side.

Besides *niveus* there are recognized from North America three other species of *Œcanthus*, one of which, *californica* Sauss.,* recorded only from California, is described as having the posterior wings abortive.† The other two species, *nigricornis* Walk. from Illinois (description quoted in the *American Entomologist*, Vol. II, p. 207; 1870) and *varicornis* Walk. from Mexico, both described only in the female sex and differing from *niveus* in nothing but the slightly longer hind wings and the slightly greater size of the insect, and in *varicornis* having a slightly longer prothorax, have been retained as distinct species by Saussure. But *niveus*, as may be seen in a series of specimens, varies in these characters indefinitely, just as other species of crickets are admitted to vary; so we may consider Walker's species to be but varieties of *niveus*. They cannot be referred to *latipennis*, for in this species the wings rarely, and then but slightly, exceed the elytra.

One other North American species, *bipunctatus* DeG., has been referred to *Œcanthus*. It belongs, however, to the genus *Xabea* and should be known as *Xabea bipunctata* (DeG.).

As the female of *Xabea*‡ has not hitherto been described and Saussure did not recognize the genus as distinct from *Œcanthus*, it may be well to give here the characters drawn from both sexes to show how very clearly the two genera differ. The type of the genus is from Sumatra, and Walker, being unacquainted with our species, an Saussure, d having only imperfect specimens, both failed to recognize the existence of the genus in North America.

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*Études sur les Orthoptères, (*in* Mission Scientifique au Mexique, etc. Recherches Zoologiques 6^{me} partie.) 3^{me} livraison; p. 462; 1874.

†By "abortive" is evidently meant, from the description following the diagnosis, simply shorter than abdomen. In this respect and in the male (which alone is described) being shorter than *niveus*, *californicus*, which I know only from the description, may most easily be distinguished.

‡Walker, Cat. Derm. Salt. Brit. Mus., Pt. I, p. 109.

XABEA Walk.—First joint of antennæ armed with a stout, blunt tooth in front. Female elytra irregularly reticulated, the oblique longitudinal veins not being conspicuous; male elytra with the mediastinal vein strongly arcuated; no humeral angle. Wings twice as long as the elytra. Cerci only half as long as the abdomen, sinuous. Outer valves of the ovipositor ending in a single outwardly directed tooth which is preceded on the outside by a longitudinal series of three teeth; the inner valves compressed, ending in three teeth of which the middle one is much the longest. Posterior tibiæ with neither spurs nor serrations and having only 4 apical spurs, 2 within and 2 without; the first joint of posterior tarsi unarmed, the tarsi clearly but 3-jointed, the second joint short as in the other legs; tarsal claws with the inner tooth acute.

OROCHARIS SALTATOR Uhler (Rep. V, p. 119).—The eggs figured and described on page 119 as probably those of this insect are, as above stated, those of *Œcanthus latipennis*. I have, however, frequently obtained the eggs of the Orocharis since. In December, 1877, I watched a female ovipositing in the end of a dead and rather soft twig of the Soft-maple at Kirkwood, Mo. The twig had been pruned and the bark was somewhat gnawed by the cricket and the eggs thrust in irregularly from the end and from the sides. Both wood and pith were crammed with eggs, but all longitudinally inserted. The favorite nidus of the species is, however, the soft and somewhat corky, rough bark of the trunk and older branches of the American elm, the eggs being thrust in singly or in small batches, either longitudinally with, or very slightly obliquing from, the axis of trunk or branch. The female is very intent in the act, working her abdomen deliberately from side to side during the perforation. The ovipositor is held more obliquely than in *Œcanthus*.

The egg is amber-colored and very slender and elongate, the tip rather pointed and very faintly opaque with the surface but slightly granulate. It has scarcely any curve and varies from 3.5^{mm} to 4^{mm} in length and from 0.4^{mm} to 0.5^{mm} in diameter at middle.

The stridulation of this cricket is a rather soft and musical piping of not quite half a second's duration, with from 4 to 6 trills, but so rapid that they are lost in the distance. The key is very high, but varies in different individuals and according to moisture and temperature. It most resembles the vibrating touch of the finger on the rim of an ordinary tumbler when three-fourths filled with water—repeated at intervals of from 2 to 4 per second, and it may be very well likened to the piping of a young chick and of some tree frogs. As the species is very common in the Southwest its chirp is everywhere heard and is so distinctive that when once studied it is never lost amid the louder racket of the katydids and other night choristers. It is frequently heard during the day time in cloudy or damp weather, and I have heard it at Saint Louis the first days of November after a slight frost. The elytra in stridulating are raised less than in *Œcanthus* and are depressed at intervals.

The courting of the sexes is amusing. They face each other and play with their antennæ for the best part of an hour or more than an hour. The female is, otherwise, pretty quiet, but the male continually mouths the twig or the bark upon which the courting is being done, and plays his palpi at a great rate, very stealthily approaching nearer to his mate meanwhile. At last the antennal fencing ceases and those of the female bend back and then the male approaches until their heads touch. He then deliberately turns round, elevates the elytra and slips his abdomen under the female, who virtually mounts and assists him, his elytra overshadowing her head.

The eggs of this insect, as also those of *Œcanthus latipennis*, are devoured by a parasitic larva of similar form and size, and which I have not yet reared to the perfect state.

ORCHELIMUM GLABERIMUM, Burm. (Rep. V, p. 123)—The egg-punctures illustrated at Fig. 56 are, as there correctly supposed, those of this species, as I have since proved by watching the act of oviposition and by rearing from the eggs. The insect is very fond of using the tops of corn-stalks for the same purpose.

NEUROPTERA.

CORYDALUS CORNUTUS, L. (Rep. V, p. 141; IX, p. 125)—For additional facts relating to the early larval stages, see my notes on the "Larval Characteristics of Corydalus and Chauliodes and on the development of Corydalus cornutus (Proc. Am. Ass. Adv. Sc., 1878).

MITES.

TROMBIDIUM SERICEUM Say (Rep. VII, p. 175 and subsequently)—For the natural history of this species and the specific identity with it of the larval form known as *Astoma gryllaria* LeBaron, and for further facts respecting the other mites mentioned in the Report, see my remarks in the Transactions of the Academy of Science of Saint Louis, (Vol. III, p. cclxvii, October, 1877) in the *American Naturalist* for March, 1878, and in the First Report of the Commission (p. 306 ff.).

DESCRIPTIONS OF NEW SPECIES AND VARIETIES.

Some systematists have questioned whether descriptions of species in Agricultural Reports should be recognized. While my own views on this subject are pretty freely expressed on page 56 of my Third Missouri Report and elsewhere, the publication of this Bulletin affords a good opportunity to bring the descriptions that are scattered through the nine volumes together, with such notes on synonymy as present knowledge suggests, and such corrections as are given in the Errata. In the earlier reports the measurements were expressed in inches and hundredths of an inch, while in the later volumes the metric system was adopted as most convenient and accurate, and the measurements which follow have all been reduced to this standard. All changes of this character or other changes from the original are included in brackets, while the additional notes are in Long Primer type.

HYMENOPTERA.

PORIZON CONOTRACHELI, N. SP.—*Head* pitchy-black, opaque, the ocelli triangularly placed and close together; eyes oval, polished, and black; face covered with a silvery-white pubescence; labrum rufous, with yellowish hairs; mandibles and palpi, pale yellowish-brown; antennæ inserted in depressions between the eyes, reaching to metathorax when turned back, filiform, 24-jointed; black with basal joints 6–1 becoming more and more rufous, the bulbus always distinctly rufous; bulbus rather longer and twice as thick as joint 3; joint 2 about one-third as long. *Thorax* pitchy-black, opaque, the sides slightly pubescent with whitish hairs, the mesothorax rounded and bulging anteriorly, the scutellum slightly excavated and sharply defined by a carina each side; metathorax with the elevated lines well defined and running parallel and close together from scutellum to about one-fourth their length, then suddenly diverging and each forking about the middle. *Abdomen* glabrous, polished, very slender at base, gradually broader and much compressed from the sides at the apex which is truncated; peduncle uniform in diameter and as long as joints 2 and 3 together; joints 2–5 subequal in length; color rufous with the peduncle wholly, dorsum of joint 2, a lateral shade on joint 3, and more or less of the two apical joints superiorly, especially at their anterior edges, black; venter more yellowish: ovipositor about as long as abdomen, porrect when in use, curved upwards when at rest, rufous, with the sheaths longer and black. *Legs*, including trochanters and coxæ uniformly pale yellowish-brown with the tips of tarsi dusky. *Wings*, subhyaline and iridescent, with veins and stigma dark brown, the stigma quite large, and the two discoidal cells subequal and, as usual in this genus, joining end to end, but with the upper veins which separate them from the radial cell, slightly elbowed instead of being straight, thus giving the radial cell a quadrangular rather than a triangular appearance. ♂ differs from ♀ only in his somewhat smaller size and unarmed abdomen. Expanse ♀ 0.32 inch [= 8^{mm}], length of body, exclusive of ovipositor, 0.22 [= 5.5^{mm}]; expanse ♂ 0.28 [= 7^{mm}], length 0.18 [= 4.5^{mm}].

Described from 3 ♀ ♀, 1 ♂ bred May 26th–28th, 1870, from cocoons received from Dr.

I. P. Trimble, of New Jersey, and 1 ♀ subsequently received from the same gentleman—all obtained from larvæ of *Conotrachelus nenuphar*.

As I am informed by Mr. E. T. Cresson, of Philadelphia, who pays especial attention to the classification of the *Ichneumonidæ*, it might more properly be referred to Holmgren's genus *Thersilochus*, which differs from *Porizon* in the greater distance between the antennæ at base, and in the venation of the wing.—[Third Rept., p. 28, Fig. 9.

LIMNERIA LOPHYRI, N. SP.—♀, length 0.30—0.35 inch [7.5—8.7^{mm}]. Head and thorax black with silvery white pile. Antennæ piceous, more than half as long as body; but slightly paler toward tip; bulbus either yellowish or rufous. Ocelli either rufous or black. Mandibles, palpi, front and middle coxæ trochanters and tibiæ, pale yellow. Tegulæ almost white. Abdomen, with faint pile, rufous, the petiole and sides of next joint usually blackish. Hind legs rufous, the base of tibiæ and of tarsi paler.

♂ somewhat smaller, and with more black on the abdomen.

Four ♂'s, 12 ♀'s bred from larvæ of *Lophyrus Abbotii*.—[Ninth Rept., p. 32.

HEMITELES (?) CRESSONII, [N. Sp.]—♂—Length 0.25 [6^{mm}]. Black, opaque, head transversely-subquadrate; face clothed with pale glittering pubescence; spot on mandibles, palpi, scape of antennæ in front and the tegulæ, white; eyes large, ovate; antennæ longer than head and thorax, slender, black; thorax closely and minutely punctured; mesothorax with a deeply impressed line on each side anteriorly; scutellum convex, closely punctured, deeply excavated at base; metathorax coarsely sculptured, truncate and excavated behind, the elevated lines sharply defined, forming an irregularly shaped central area, and a triangular one on each side of it, the outer posterior angle of which is prominent and subacute; wings hyaline, iridescent, nervures blackish, stigma large, areolet incomplete, the outer nervure wanting; legs pale honey-yellow, coxæ paler, tips of posterior femora, and their tibiæ and tarsi entirely blackish; abdomen elongate ovate, flattened, petiolated, the first segment flat, gradually dilated posteriorly, somewhat shining, and indistinctly longitudinally aciculate; the two following segments opaque, indistinctly sculptured; remaining segments smooth and shining.—[First Rept., p. 177. Figured at Pl. II, Fig. 7.

HEMITELES (?) THYRIDOPTERIGIS, N. SP.—♀ Length 0.36 [inch = 9^{mm}]; expanse 0.50 [inch = 12.5^{mm}]. Ferruginous, opaque. Head transverse, rather broader than thorax, the front much depressed; face prominent centrally beneath antennæ, closely punctured, thinly clothed with pale pubescence; clypeus and cheeks shining; tips of mandibles black; antennæ, long, slender, filiform, ferruginous, blackish at tips; thorax rugose; scutellum prominent, with sharp lateral margins; metathorax prominent, quadrate, abrupt laterally and posteriorly, finely reticulated and pubescent, the upper posterior angles produced on each side into a long, divergent, flattened, subacute spine; disk with two longitudinal carinæ, from which diverges a central transverse carina; tegulæ piceous; wings hyaline, subiridescent; a narrow, dark fuliginous band crosses the anterior pair a little before the middle, and a broad band of same color between middle and apex, this band having a median transverse hyaline streak; areolet wanting, second recurrent nervure straight, slightly oblique; apex of posterior wing fuscous; legs long and slender, ferruginous, more or less varied with fuscous; posterior coxæ, tips of their femora, and their tibiæ and tarsi, fuscous; base of four posterior tibiæ more or less whitish, forming a rather broad annulus on posterior pair; abdomen petiolated, subconvex, densely and finely sculptured, blackish, basal segment tinged with reddish, the second and third segments distinctly margined at tip with whitish; apical segments smooth and shining, thinly pubescent; ovipositor half as long as abdomen, sheaths blackish.

♂.—Not at all like the ♀. Length 0.33 [inch = 8^{mm}], expanse 0.44 [inch = 11^{mm}]. Long, slender, black, polished, without distinct punctures, thinly clothed with white pubescence; palpi white; antennæ long, slender; scape reddish; mesothorax gibbous, with two deeply impressed longitudinal lines; metathorax with well-defined elevated

lines, forming several irregular areas; sides rugulose, apex without spines or tubercles; tegulæ white; wings whitish-hyaline, subiridescent, the nervures and stigma white, subhyaline, neuration as in ♀; legs long, slender, pale honey-yellow; coxæ, posterior trochanters, apex of their femora, and their tibiæ and tarsi, blackish; base of posterior tibiæ with a white annulus; abdomen long, slender, flattened, petiolated, smooth and polished, the apical margin of second segment being narrowly whitish.

Described from four ♀ and one ♂ specimens bred from the same [Thyridopteryx] cocoon.—[First Rept.p. 150. Figured at Pl. II, Figs. 11, 12.

The species is quite common in Washington, D. C., and is often attacked by a secondary Chalcid parasite.

MICROGASTER LIMENITIDIS, N. SP.—♂ ♀. Length 0.09 inch [$=2\frac{1}{4}$mm]. Color pitchy-black. Antennæ black, about as long as body; palpi whitish. *Thorax* minutely punctured. *Abdomen* with the two or three basal joints emarginate and rugose, the terminal joints smooth and polished. *Legs* dusky; front and middle femora yellowish, hind femora black; front and middle tibiæ yellowish, hind tibiæ with terminal half dusky, but the spur pale; front and middle tarsi yellowish tipped with dusky, hind tarsi dusky above, paler below. *Wings* hyaline, iridescent, the nervures and stigma black or dark-brown, the radial nervule, the cubital nervules and the exterior nervule of the discoidal cell, sub-obsolete.

Described from 6 ♀, 1 ♂, bred from larvæ of *Limenitis disippus*.—[Third Rept., pp. 158, 159.

The specimens referred to in connection with this description as bred from *Gelechia gallæsolidaginis* prove to belong to a distinct species. Both species belong to the genus *Apanteles* Först. as at present accepted. See my "Notes on N. A. Microgasters" (Trans. Ac. Sc. St. Louis, IV, *Author's separata*, p. 13.)

MICROGASTER GELECHIÆ.—Length 0.20 [$=5$mm] ♂ ♀.—Black, clothed with a short, thin, glittering, whitish pubescence, most dense on the face, which latter is closely punctured; occiput and cheeks shining; mandibles rufopiceous; palpi whitish; eyes pubescent; antennæ as long as the body in ♂, shorter in ♀, 18-jointed; thorax shining, feebly punctured, mesothorax closely and more strongly punctured, with a deeply impressed longitudinal line on each side over base of wings; scutellum smooth and polished, the lateral groove broad, deep, arched and crenulated; metathorax opaque, densely rugose, with a sharp, central, longitudinal carina, and a smooth, flat, transverse carina at base; tegulæ testaceous, wings hyaline, iridescent, apex smoky, nervures blackish, areolet complete, subtriangular, radial nervure indistinct; legs pale honey-yellow, coxæ blackish, pale at tips, middle pair in ♀ concolorous with legs; abdomen with the two basal segments densely rugose and opaque, the remainder smooth and shining; venter more or less varied with pale testaceous.—[First Rept., p. 178.

This is a true *Microgaster*.

PERILITUS INDAGATOR, N. Sp—Imago—♀, *Head* almost glabrous, transverse, deep honey-yellow, the trophi pale, except the tips of jaws, which are dusky; ocelli touching each other, black; eyes black, very large, occupying nearly the whole side of face, and with a few very short hairs; antennæ with about 24 joints, pale fuscous; reaching, when turned back, to about the middle of abdomen. *Thorax* honey-yellow beneath and very slightly pubescent; very finely punctured and slightly pubescent above; prothorax honey-yellow and prominently convex; mesothorax with lateral and posterior sutures black; metathorax black. *Abdomen* with the pedicel black and slightly punctured; depressed, narrow at base, widening behind, slightly pubescent above; the other joints glabrous, polished, deep honey-yellow, the second joint largest and as long as all the subsequent ones together; ovipositor extending about the length of the abdomen beyond its tip, rufous with the sheaths black. *Legs*

pale honey-yellow, the tarsi, especially at tips, slightly dusky, the hind femora and tibiæ a little dusky towards tips, and a narrow rufous ring at base of former. *Wings* hyaline, iridescent; veins brown; stigma honey-yellow, with an opaque brown cloud; two cubital cells, the outer small, sub-quadrate; the radial large; one discoidal, long and narrow. Length, exclusive of ovipositor, 0.18 inch [= 4.5^{mm}].

Described from 1 ♀ bred from *Acrobasis juglandis*, LeB.—[Fourth Rept., p. 43.

SPATHIUS TRIFASCIATUS, N. Sp.—♀. Average length, 0.18 inch [= 4.5^{mm}]. Color, light-brown. *Head* pubescent, palpi long and pale; eyes black; ocelli black, contiguous; antennæ smooth, pale, and reaching to second abdominal joint. *Thorax* with sutures dark-brown; legs more or less dusky, the tarsi (except at tip) an annulus at base of tibiæ, and the trochanters, pale; wings fuliginous, with a white fascia at base, at tip and across outer middle of front wing, including the inner half of stigma, the outer half of which is dark-brown; middle fascia most clearly defined. *Abdomen* slightly pubescent at sides and tip; first joint pale, petiolate, and with short and longitudinal aciculations above; second joint pale above, the others more or less brown; ovipositor pale, dusky at tip, and long as abdomen.

One bred specimen.

♂—Differs in being much darker colored, the head, thorax and femora being brown, and the metathorax and base of first abdominal joint black.

One bred specimen.—[Fifth Rept., p. 106.

BRACON CHARUS, N. sp.—♀ Length of body 0.35 inch [=8.7^{mm}]; of ovipositor 0.40 inch [= 10^{mm}]; expanse of wing 0.65 inch [=16^{mm}]. Colors black and deep rufous. Head, thorax, legs and antennæ polished black, the legs and sides of head and thorax with a fine grayish pubescence; trophi also black. Abdomen uniformly deep rufous. Terebra of ovipositor pale yellow, the sheaths black and very faintly pubescent. Wings deep fuliginous with a faint zig-zag, clear line across the middle from the stigma.

Described from 7 ♀'s, all bred from *Chrysobothris femorata*.—[Seventh Rept., p. 75. Fig. 13.

BRACON SCOLYTIVORUS, Cress.—♀—Black, shining, metathorax and base of abdomen pubescent; face, anterior orbits, lower half of cheeks, clypeus, mandibles, except tips, palpi, tegulæ, legs, including coxæ, and abdomen, honey-yellow, the latter darker; posterior coxæ sometimes dusky; antennæ at base beneath, dull testaceous; wings fuliginous, apical half paler, iridescent; abdomen shining, first segment whitish laterally, the base and disc sometimes dusky; base of second segment with a large subtriangular flattened space inclosed by a deep groove, the posterior side of which is generally blackish; ovipositor longer than abdomen; sheaths black; length, .15—.17 inch [= $3\frac{3}{4}$—$4\frac{1}{4}$^{mm}].

♂—More pubescent; posterior coxæ blackish, also the femora above, especially the posterior pair; posterior tibiæ dusky; abdomen black, polished; apex of first, basal half of second, and sides of apical segments more or less honey-yellow; sides of basal segment whitish; wings paler; abdomen narrower and rather more convex; length, .16 inch [=4^{mm}].

Three ♂, three ♀ specimens.—[Mr. E. T. Cresson, in Fifth Rept., p. 106.

SIGALPHUS CURCULIONIS, Fitch—*Imago.*—*Head* black, sub-polished, and sparsely covered on the face with short whitish hairs; ocelli touching each other; labrum and jaws brown; palpi pale yellow; antennæ (Fig. 7, *c*) 27-jointed, filiform, reaching, when turned back, to middle joint of abdomen and beyond, the bulbus and small second joint rufous and glabrous, the rest black or dark brown, though 3–10 in many specimens are more or less tinged with rufous; 3–14 very gradually diminishing in size; 14–27 subequal. *Thorax* black, polished, the metathorax distinctly and broadly punctate, and the rest more or less distinctly punctate or rugose, with the sides sparsely pubescent. *Abdomen* pitchy-black, flattened, the dorsum convex, the venter concave, and the sides narrow-edged and slightly carinated; the three joints distinctly separated and of about equal length; the first joint having two dorsal longitudinal carinæ down the

middle; all densely marked with very fine longitudinally impressed lines, and sparsely pubescent; (Dr. Fitch in his description published in the *Country Gentleman*, under date of September, 1859, states that these lines leave "a smooth stripe along the middle of its second segment and a large smooth space on the base of the third;" which is true of a few specimens, but not of the majority, in which the impressed lines generally cover the whole abdomen.) Ovipositor longer than abdomen, but when stretched in a line with it, projecting backwards about the same length beyond; rufous, with the sheaths black. *Legs* pale rufous, with the upper part of hind tibiæ and tarsi, and sometimes the hind femora, dusky. *Wings* subhyaline and iridescent, the veins pale rufous, and the stigma black. Length ♀, 0.15–0.16 inch [=3.7–4^{mm}], expanse 0.30 [=7.5 ^{mm}]; ♂ differs only in his somewhat smaller size and in lacking the ovipositor. In many specimens the mesothorax and the eyes are more or less distinctly rufous.

Described from 50 ♀♀, 10 ♂♂, bred June 23d–July 29th, 1870, from larvæ of *Conotrachelus nenuphar*, and 2 ♀♀ obtained from Dr. Fitch.

Larva (Fig. 8, *a*)—White, with translucent yellowish mottlings.

Pupa (Fig. 8, *c* ♀)—0.17 inch [=4¼^{mm}] long; whitish, the members all distinct, the antennæ touching hind tarsi, the ovipositor curved round behind, reaching and touching with its tip the third abdominal joint, which afterwards forms the apical joint of imago; five ventral joints, which in the imago become much absorbed and hidden, being strongly developed.

Cocoon (Fig. *c*, *b*)—Composed of one layer of closely woven yellowish silk.

VARIETY RUFUS—Head, thorax, and most of the first abdominal joint entirely rufous, with the middle and hind tibiæ dusky, and the ovipositor three times as long as abdomen and projecting more than twice the length of the same beyond its tip.

Described from three ♀♀ bred promiscuously with the others. This variety is slightly larger and differs so remarkably from the normal form that, were it not for the absolute correspondence in all the sculpturing of the thorax and body, and in the venation of the wings, it might be considered distinct. The greater length of the ovipositor is very characteristic, and accompanies the other variation in all three of the specimens.—[Third Rept., p. 27. Fig. 7.

EURYTOMA BOLTERI, N. Sp.—♀ Length 0.18 inch [=4.5 ^{mm}]. Antennæ black, not much longer than the face, perceptibly thicker towards the end, and apparently 10-jointed, though the three terminal joints are almost always confluent. Dimensions and appearance of joints, represented in the annexed Figure 97, *a*. Head and thorax rough-punctured and finely bearded with short, stiff gray hairs. Abdomen about as long as thorax, scarcely so broad, viewed from above, but wider viewed laterally; highly polished, smooth and black, the three terminal segments with minute stiff gray hairs along the sutures; visibly divided into seven segments, the four anterior ones of about equal length, the two following shorter, and the terminal one produced into a point. Legs fulvous with the *coxæ*, [trochanters], thighs and more or less of the shanks blackish-brown. Wings perfectly transparent, glossy, colorless, and with the nerves very faint.

♂ Measures but 0.14 inch [=3.5^{mm}], and differs in the antennæ, being twice as long as the face, in their narrowing towards the tip and in being furnished with whorls of long hairs. The number of joints are not readily made out, and I have consequently presented at Figure 97, *b*, a magnified figure. His body is but half as wide and half as long as the thorax viewed from above, and not quite as broad as the thorax, viewed laterally; it it also lacks the produced point of the ♀. His wings are also cut off more squarely and more distinctly nerved.—[First Rept., p. 187. Pl. II, Fig. 9.

For further descriptive details see Walsh's posthumous paper on the *Eurytomides* (*Am. Ent.* II, p. 298–9), where the insect is looked upon as a variety of *Eurytoma diastrophi*.

[TRICHOGRAMMA MINUTA, N. Sp.] * * * It comes nearest the genus *Trichogramma*, Westw., and may be provisionally called *Trichogramma* (?) *minuta*. It differs

from that genus and from all other Chalcididan genera with which I am acquainted, in the antennæ being but 5-jointed (scape, plus 4 joints), the scape stout and as long, or longer, than joints 2, 3, and 4 together; joints 3 and 4 small and together as long as joint 2; 5 very stout, fusiform, and as long as 2, 3, and 4 together. The legs have the trochanters stout and long, the tibiæ not quite so long nor so stout as the femora, and with a long tooth; the tarsi are 3-jointed, with the joints of equal length and with the claws and pulvilli sub-obsolete. The abdomen is apparently 6-jointed, the basal joint wide, the 2nd narrower, 2–5 increasing in width till 5 is as wide as 1. The ovipositor of ♀ extends a little beyond the apex, and starts from the anterior edge of the 5th joint.—[Third Rept., p. 158. Fig. 72.

The species was provisionally referred to *Trichogramma*, and I subsequently proposed for it the generic name *Pentarthron* (Record of Am. Ent. 1871, p. 8). *Pentharthrum* has, however, been used by Wollaston in beetles, and until allied genera are better characterized than at present, the old generic name may be retained.

COLEOPTERA.

BRUCHUS FABÆ N. Sp. (Fig. 19,)—General color tawny-gray with more or less dull yellowish. *Body* black tinged with brown and with dull yellowish pubescence, the pygidium and sides of abdomen almost always brownish. *Head* dull yellowish-gray with the jaws dark brown and palpi black; antennæ not deeply serrate in ♀, more so in ♂; dark brown or black with usually 5, sometimes only 4, sometimes 4 and part of 5 basal joints, and with the terminal joint, more or less distinctly rufous, or testaceous, the color being so slight in some specimens as scarcely to contrast at all with the darker joints. *Thorax* narrowed before, immaculate, but with the pubescence almost always exhibiting a single pale medio-dorsal line, sometimes three dorsal lines, more rarely a transverse line in addition, and still more rarely (two specimens) forming a large dark, almost black patch each side, leaving a median stripe and the extreme borders pale and thus approaching closely to *erythrocerus* Dej.; base with the edges almost angulated; central lobe almost truncate and with a short longitudinal deeply impressed median line; no lateral notch; scutel concolorous and quadrate with the hind legs more or lest notched. *Elytra* with the interstitial lines having a slight appearance of alternating transversely with dull yellowish and dusky; so slight however that in most of the specimens it can hardly be traced: the dark shadings form a spot on each shoulder and three transverse bands tolerably distinct in some, almost obsolete in others, the intermediate row being the most persistent and conspicuous: between these dark transverse rows the interstices are alternately more or less pale, especially on the middle of the 3rd interstitial lines. *Legs* covered with grayish pubescence, and with the tibiæ and tarsi, especially of first and second pair, reddish-brown; the hind thighs usually somewhat darker, becoming black below and inside, and with a tolerably long black spine followed by two very minute ones. Length 0.09—0.14 inch [$=2\frac{1}{4}-3.5^{mm}$]. Described from 40 specimens all bred from different kinds of beans. Hundreds of others examined.

This insect has been for several years ticketed in some of the Eastern collections by the name of *B. fabæ*, or else, what is worse, the corruption of it, *fabi*. The former name has been disseminated by my friend F. G. Sanborn of Boston, Massachusetts, who says that he received the weevil thus named, together with beans attacked by it, in the year 1862 from Rhode Island. The name was credited to Fabricius, but I can find no notice in any of the works I possess of any European *Bruchus fabæ*, and several of my Eastern correspondents who have access to large libraries have been unable to find any description or allusion to a species by that name. Dr. LeConte has given it the MS name of *varicornis* but as his description will not appear perhaps for years to come and as no comprehensive description has yet been published, I have deemed it advis-

able to dispel in a measure the confusion that surrounds the nomenclature of the species. There is need of a description of so injurious an insect, and as *fabæ* is not preoccupied I adopt the name because it is entirely appropriate and because it is more easily rendered into terse popular language than *varicornis*.

It resembles most closely of any other species which I have seen, the *B. erythrocerus*, Dej., which, however, is smaller, and differs in having a narrower thorax which has light sides and a dark, broad dorsal stripe divided down the middle by a pale narrow line: *erythrocerus* is further distinguished by the antennæ being entirely testaceous and the hind thighs more swollen.

From *obsoletus* Say, *fabæ* differs materially: *obsoletus* is a smaller species, dark gray, with the antennæ all dark, the pygidium not rufous, the thorax with a perceptibly darker dorsal shade so that the sides appear more cinereous, a white scutel, and each interstitial line of the elytra with a slight appearance of alternating whitish and dusky along its whole length; for though there is nothing in Say's language to indicate whether it is the interstitial lines that alternate transversely, whitish and dusky, or each line that so alternates longitudinally, I find from an examination of a specimen in the Walsh collection, that the latter is the case, and so much so that the insect almost appears speckled. The two species differ both in size and color, though, as Say's description is short and imperfect it is not surprising that *fabæ* should have been referred to it.

From the European bean-feeding *Br. flavimanus* (which is apparently either a clerical error for, or a synonym of *Br. rufimanus*, Schœnh.) as described by Curtis, it differs notably; as it does likewise from their *Br. serratus*, Ill., which also attacks beans.

Dr. LeConte, according to Mr. Rathvon, was inclined to consider this insect the *obsoletus* of Say, from the fact that in specimens which the latter gentleman sent him, the antennæ were not varied as in his MS. *varicornis*, but uniformly black. A few specimens which Mr. Rathvon sent me nearly two years ago, taken from the same lot as were those which he forwarded to Dr. LeConte, were singularly enough, all decapitated but two; and these two showed the varied antennæ. These specimens had all been kept in alcohol, and I am greatly inclined to believe that the uniformly dark appearance of the antennæ that was noticed by LeConte was the effect of the alcohol on those which naturally had the rufous joints but faintly indicated. At all events, though Mr. Rathvon tells me that he found a small proportion of beetles with dark antennæ, after examining, at my suggestion, over two hundred specimens that had thus been kept in alcohol; yet from over one hundred specimens which he had the kindness to send me, I only find (after thoroughly drying them) three with the terminal joint really as dark as the subterminal, and not a single one in which the rufous basal joints cannot be more or less distinctly traced.—[Third Rept., p. 55-56. Fig. 19.

Since the above was written, Dr. Horn has given us a revision of the *Bruchidæ* of the United States (Trans. Am. Ent. Soc., Vol. IV, 1873), in which he makes *fabæ* a synonym of *obsoletus* Say, expresses regret that another synonym must be added and states that the *obsoletus* which I referred to is the *transversus* Say (=*hibisci* Oliv.). This criticism is not deserved, and while the decision of one who has done such excellent work in Coleoptera as Dr. Horn has will be generally accepted as final, yet no one can compare his redescription of *obsoletus* with Say's description and not feel that the two apply to different insects. *Fabæ* is usually one-third larger, tawny-gray above with vari-colored antennæ, concolorous scutel, emarginate behind, and rufous legs and abdomen; *obsoletus*, on the contrary, according to Say, is blackish-cinereous, the thorax cinereous each side, with a whitish scutel and with the abdomen and legs not differing in color from the rest of the body. *Fabæ* breeds in beans; *obsoletus* in the seeds

of *Astragalus*. Indeed one would be far more justified in considering *B. alboscutellatus* Horn a synonym of *obsoletus* Say than in considering *fabæ* a synonym of it, and when the Bruchus from Astragalus in the Eastern States is bred, I fully expect Dr. Horn to change his mind. Nor is the assumption justifiable that the *obsoletus* referred to by me, and destroyed in the Walsh collection, is *hibisci* Oliv. It was far more like *alboscutellatus* as far as I remember, and there is not a character about this species which does not accord with Say's description of *obsoletus* except that the scutel is described as *rounded*, while that of *obsoletus* is described by Say as quadrate. I am of opinion that too much stress has been laid on this difference by Dr. Horn, as, when the pubescence is separated behind, the scutel appears quadrate, whereas in *fabæ* it appears bifid. The scutel of *alboscutellatus* when denuded is quadrate, but it is doubtless the clothed appearance which Say described. Say, as appears from his text, had abundant material, and it is assuming too much to suppose that he could overlook the striking differences in size and coloration of *fabæ*, as above indicated.

The specific name *fabæ* was used by Brullé for *Bruchus pisorum* Linn.

MADARUS VITIS, N. Sp.—Length, exclusive of rostrum 0.10 [inch=2.5^{mm}]. Color uniformly rufous, without maculations, the eyes alone being darker. Highly polished; rostrum arcuated, stout and about as long as thorax; thorax and body with extremely minute and distant punctures, anterior margin of thorax abruptly narrowed, especially laterally, into a collar; elytra slightly undulate, with 4 distinct elevations, one on the extreme outer margin close to the thorax, and one on the middle of each, near the extremity.—[First Rept., p. 132. Fig. 74.

For further details as to the synonymy of this insect, see *American Entomologist* I, p. 105. Dr. LeConte's description of *Baridius sesostris* was published about three months earlier than my own and he subsequently (Proc. Amer. Phil. Soc., Vol. XV, 1876, p. 299) erected the genus *Ampeloglypter* for this and two other species, so that *Madarus vitis*=*Ampeloglypter sesostris* Lec.

ANALCIS FRAGARIÆ, N. Sp.—*Imago*, (Fig. 14, *b*, *c*)—Color deep chestnut-brown, subpolished, the elytra somewhat lighter. Head and rostrum dark, finely and densely punctate and with short fulvous hairs, longest at tip of rostrum; antennæ rather lighter towards base, 10-jointed, the scape much thickened at apex, join 2 longest and robust, 3 moderately long, 4–7 short, 8–10 connate and forming a stout club. Thorax dark, cylindrical, slightly swollen across the middle and uniformly covered with large thimble-like punctures, and with a few short coarse fulvous hairs, unusually arranged in three more or less distinct longitudinal lines; pectoral groove ending between front legs. Abdomen with small remote punctures and hairs which are denser towards apex. Legs of equal stoutness, and with shallow dilated punctures and uniform very short hairs. Elytra more yellowish-brown, dilated at the lower sides anteriorly, and with about 9 deeply-punctured striæ, the striæ themselves sometimes obsolete; more or less covered with coarse and short pale yellow hairs which form by their greater density, three more or less conspicuous transverse bands, the first of which is at base; between the second and third band, in the middle of the elytron, is a smooth dark-brown or black spot, with a less distinct spot of the same color below the third, and a still less distinct one above the second band. Length 0.16 inch [=4^{mm}].

Described from four specimens bred from strawberry-boring larvæ. The black spots

on the elytra are quite distinct and conspicuous on two specimens, less so on one, and entirely obsolete on the other.

Larva, (Fig. 14 *a*)—White with back arched Lamellicorn-fashion. Head gamboges yellow, glabrous, with some faint transverse striations above mouth; mandibles rufous-tipped with black; labrum emarginate, and with palpi, pale. A faint narrow dorsal vasculer line. Legs replaced by fleshy tubercles. Length 0.20 inch [=5^{mm}] when stretched out.—[Third Rept., p. 44. Fig. 14.

Say's generic name *Tyloderma* having priority over Schönherr's *Analcis*, the name of this insect becomes *Tyloderma fragariæ*.

LEPIDOPTERA.

ÆGERIA RUBI, N. Sp.—*Imago.*—Expanse, ♂, 1.00 [inch=25^{mm}]; ♀, 1.25 inch [=31^{mm}]. Front wings transparent, with a broad costal border extending half the width of wing at base, a narrow discal spot, and more or less of the tip dull-ferruginous; the inner border, the inner longitudinal vein, the intermediate space toward posterior angle, and sometimes its whole length, of the same color; veins brownish within and black without the discal spot. Hind wings perfectly transparent, or rarely with a few sparse ferruginous scales; the transverse discal vein pale, the others pale at base, but black toward extremities; costa narrowly golden-yellow, becoming darker toward apex. Fringes dark-brown, those of hind wings appearing darkest by virtue of a dark wing border. Under surface somewhat paler. Abdomen stout, with a very slight anal tuft in ♀; a stouter one in ♂. Antennæ blue-black, not enlarging toward tip, quite pectinate in ♂. Palpi, a narrow ring around neck, the sides of the collar, a broad band curving across tegulæ and around the base of wings, a faint line across middle of thorax, two faint longitudinal lines between it and collar, legs, except outer base (sometimes whole length) of femora and tibiæ, hind third of abdominal joints, and a dorsal and lateral series of abdominal tufts or patches (the dorsal ones, especially on 3d and 7th joints, most persistent and conspicuous)—all golden-yellow: the rest of body black. The orbits are of a somewhat paler-yellow, and the face either gray or bluish.

♂ differs from ♀ in the darker color of primaries, the narrower fringe of secondaries, the narrower ferruginous spot at apex of primaries, the more tufted abdomen, the broader and darker anal tuft, and the pectinate antennæ.

Described from 6 ♂'s, 6 ♀'s, bred from *Rubus*. Approaches nearest to *Trochilium marginatum* Harr., and *T. tibiale* Harr.,* from which it differs in the thoracic marks and the abdominal tufts.

Larva—Length 0.90–1.10 inch [=22.5–27.5 ^{mm}]; diameter 0.18 [=4.5^{mm}]. Color pale-yellow. Head dark-brown, with a few whitish hairs; mandibles black, the other trophi paler. Cervical shield horny, pale-brown. Each joint with 8 pale, shiny piliferous spots, transversely arranged on 2, 3 and 12; the dorsal 4 quadrangularly arranged and the lateral 2 interrupted by stigmata on all the others. Thoracic legs slightly tinged with brown; prolegs, with the hooklets dark. Several specimens examined.—[Sixth Rept., p. 113. Fig. 30.

ACRONYCTA POPULI, N. Sp.—*Larva*—Length 1.50 [inch, =37^{mm}]. Color yellowish-green, covered with long soft bright yellow hairs which spring immediately from the body, part on the back, and curl round on each side. On top of joints 4, 6, 7, 8 and 11, a long straight double tuft of black hairs, those on 7 and 8 the smallest. Head polished black with a few white bristles. Joint 1 with a black spot above, divided longitudinally by a pale yellow line, giving it the appearance of a pair of triangles. Joint 2 with two less distinct black spots. Thoracic legs black; prolegs black with brownish extremities. Venter greenish-brown. Described from many specimens. When young of a much lighter color, or almost white, with the black tufts short but

* Silliman's Am. Journ. of Sc., XXXVI, p. 309 (1839).

more conspicuous, with a distinct black dorsal line, two lateral purplish-brown bands, and with hairs white, sparse and straight.

Individuals vary much: some have a black dorsal line, some have but three distinct black tufts; some have a sixth tuft of black hairs on joint 9, and others have a few black hairs on all but the thoracic joints. Just before spinning up, many of the hairs are frequently lost, and the body acquires a dull livid hue.

Moth.—♀, front wings, white, finely powdered with dark atoms which give them a very pale gray appearance; marked with black spots as follows: a complete series of small spots on posterior border extending on the fringes, one between each nerve; near the anal angle between nerves 1 and 2 a large and conspicuous spot bearing a partial resemblance to a Greek *psi*, placed sidewise, and from this spot a somewhat zigzag line running parallel with posterior border, but somewhat more arcuated towards costa, least distinct between nerves 3 and 4, and forming a large distinct dart-like spot between nerves 5 and 6; space between this line and posterior border, slightly darker than the rest of the wing-surface on account of the dark atoms being more thickly sprinkled over it; four costal marks, one subobsolete in a transverse line with the reniform spot, one conspicuous about the middle, and in a line with reniform spot and anal angle, one about the same size as the last and looking like a blurred X about one-third the length of wing from base, and one subobsolete, near the base; orbicular spot flattened and well defined by a black annulation; reniform spot indicated by a blurred black mark running on the cross-vein and sometimes somewhat crescent-formed; a V-shaped spot pointing towards base half-way between costa and interior margin, in a transverse line with the large costal spot which looks like a blurred X; a blurred mark in middle at base, and lastly a narrow spot on the inferior margin, half-way between base and anal angle. Hind wings same color as front wings; somewhat more glossy, with the lunule, a band on posterior border one-fourth the width of wing, and sometimes a narrow coincident inner line, somewhat darker than the rest; the posterior border also with a series of spots one between each nerve. Under surface of front wings pearly-white with an arcuated brown band, most distinct towards costa, across the posterior one-third, all inside of this band of a faint yellowish-brown; lunule and fringe spots distinct, and with a faint trace of the *psi*-spot; hind wings uniform pearly-white with a distinct and well defined dark wavy line running parallel with posterior margin across the posterior one-third of wing, and with the lunule and fringe spots distinct. Antennæ simple and bristle-formed, gray above, brown beneath. Head thorax and body, both above and below, silvery-gray. Legs with the tarsi alternately dusky and gray. ♂ differs from ♀ by his somewhat stouter antennæ; much narrower body, and narrower wings and fringes, the front wings having the apex more acuminate, and the hind wings scarcely showing the darker hind border.

Described from 2 ♀, 2 ♂ all bred. In the ornamentation of the front wings this species bears some resemblance to the European species *tridens* and *psi*, but otherwise differs remarkably, and especially in its larval characters. It bears a still closer resemblance both in the larva and imago state to the pale variety of a common species known in England as the "Miller" (*A. leporina*), but judging from the figures and description in "Newman's Natural History of British Moths," it may be easily distinguished from *leporina* by the well defined orbicular spot, by the greater proximity of the two large costal spots, by lacking a round spot behind the disk, and by the more prolonged apex. It differs also in the larva state from *leporina* which feeds on the Birch. It likewise closely resembles *interrupta*, though the larvæ are remarkably different; and it also resembles *lepusculina*, the larva of which is unknown; but the specific differences will be readily perceived upon comparing Guenée's descriptions. How near it approaches to *Acronycta occidentalis*, Grote, it is impossible to tell, as the author's description is exceedingly brief, considering the number of closely allied forms; but as that species has a bright testaceous tinge on the reniform spot, it evidently differs from mine. Harris's *Apatela* [*Acronycta*] *Americana*, though very differ-

ent in the imago, yet closely resembles *populi* in the larva state. I have on two occasions found the larva of *Americana* feeding on the Soft Maple, and it may be distinguished from *populi*, by its greater size; by the paler color of the body; by the hairs being paler, more numerous, shorter and pointing in all directions, especially anteriorly and posteriorly of each segment; by having on each of joints 4 and 6 two distinct long black pencils, one originating each side of dorsum, and on joints 11 one thicker one originating from the top of dorsum; by a substigmatal row of small black spots (three to each segment, the middle one lower than the others) and by a trapezoidal velvety black patch starting from anterior portion of joint 11 and widening to anus.—[Second Rept., pp. 120, 121. Figs. 87, 88.

Grote refers it, in his *List*, to *lepusculina* Gn.; having, I believe, seen the type. Guenée must have had a uniformly colored and pale specimen as my typical specimens have a distinct orbicular mark, deeper subterminal markings and the terminal space contrasting by its darker gray with the rest of primaries—all unmentioned in Guenée's description.

XYLINA CINEREA, N. Sp.—*Larva*—Length when full grown 1.20—1.30 inches [=30—32^{mm}], color shiny silvery-green on the back, darker below. A medio-dorsal cream-colored stripe; a subdorsal one represented by 3 or 4 irregularly shaped spots on each joint. A broad deep cream-colored stigmatal line, with a few green dents in it, extending to anal prolegs. Four slightly elevated cream-colored spots, encircled by a ring of rather darker green than the body, in the dorsal space, and in the subdorsal space there are four or more similar but smaller spots. Venter glaucous-gray. Head as large as joint 1, free, glassy-green with white mottlings at sides and top, and pearly-white lips. Thoracic legs whitish. Prolegs concolorous with venter. When young the body is darker and the markings paler. Described from two living specimens.

Imago (Fig. 57, *b*)—*Front wings*, with the ground-color pale cinereous shaded and marked either with light brown, having a faint purplish tint, or with darker brown, having a similar reflection, or with a colder grayish-brown with the faintest moss-green reflection: in the first two cases the dark color either blends and suffuses with the ground-color so as to give the wing a nearly uniform and smooth appearance, or else contrasts sufficiently to bring out all the marks distinct; in the latter case (two specimens) the markings are very distinct and the ground color is whiter and more irrorate. In the well-marked specimens the usual lines are readily distinguished, the basal half line, transverse anterior and transverse posterior being quite wavy, pale, and bordered each side with a dark shade, the median shade dark and well defined and the subterminal line, though sometimes pale near costa, forming a series of dark angular spots: in the more uniform specimens these lines are barely distinguishable and perhaps the most constant is the sub-terminal which most often takes the form of a series of dark angular spots: the ordinary spots have a pale inner and a more or less distinct dark outer annulation; the orbicular is larger than the reniform and is sufficiently double to take on the form of an 8, the upper part of which is always largest and with the interior space paler than the general surface, while that of the lower part is either concolorous or darker; the form is, however, quite irregular and differs sometimes in the two wings of the same species: the reniform spot is generally well defined, and is either darker, or has a tinge of reddish-brown, interiorly: at the base of the wing is a more or less distinct pale space occupying the upper half, and bordered below by a brown line which is straight about half its length and then extends upwards and outwards towards transverse anterior. A tolerably distinct terminal line, with the fringes dark. In taking a general view of the varying specimens this pale basal space, the pale upper part of the orbicular and the dark subterminal line, seem to be the most constant characters of the species. *Hind wings* gray-brown in-

clining to cinnamon-brown, with the posterior border but slightly darker and the fringe paler. Under surface quite uniform, that of front wings being nacreous gray with a faint discal spot and with a narrow costal and broad terminal border of pale fulvous, dusted with purple-gray; the hind wings of this last color with the lunule and line distinct. *Head* nearly entire, though the quadrifid arrangement of the hairs is traceable; palpi hairy throughout. *Thorax* quite square, of same color as primaries and with the collar bordered behind with brown and sometimes the edges of the tegulæ similarly bordered. *Abdomen* of same color as hind wings with lateral tufts, and cut off squarely at apex. Expanse 1.32—1.82 inches [=34—45^{mm}].

Described from 3 specimens fed on grape-vine, 2 on peaches and 1 on *Cercis canadensis*. Other captured specimens examined.

This species is the analogue of, and very closely resembles the European *Xylina conformis*, which is known under various synonyms. A specimen sent to Mr. P. C. Zeller of Stettin, Prussia, was, however, pronounced distinct. The well-marked irrorate form still more closely resembles Guenée's *cinerosa* found in Switzerland, and which he himself thinks may prove to be a variety of *conformis*. The more I study the species of the NOCTUIDÆ as they occur in nature, the more I am struck with their great variability, and there can be no doubt that many of the so-called species will turn out to be but varieties when we better understand them. In this large family none but the more strikingly marked species should ever be described without an accompanying description of their preparatory states and of their principal variations. I am unacquainted with any of Walker's species except *subcostalis*, which is very different, and if this should prove to be a synonym of any of them the fault must be laid to the difficulty under which the naturalist in the Western States labors for want of proper libraries to refer to. It differs essentially from Grote's *Bethunei* and *capax* as described and illustrated in Volume I of the Transactions of the American Entomological Society. I am informed by Mr. [J.] A. Lintner of Albany, N. Y., that Dr. A. Speyer of Rhoden, Fürstenthum Waldeck, Prussia, who gives much attention to the Noctuidæ, has it marked *Celæna oblonga* in his MS., but the insect evidently does not belong to that genus, and as the German pronunciation of *Xylina* much resembles the English pronunciation of *Celæna*, the reference to the latter is doubtless due to a verbal misunderstanding.—[Third Rept., pp. 135, 136. Fig. 57.

Now referred, in Grote's *List of Noctuidæ of N. A.*, to Hübner's genus *Lithophane*.

AMPHIPYRA CONSPERSA, N. Sp.—*Larva.*—Found full grown July 2, 1867, on Hazel. No pyramidal hump, and of a uniform emerald-green, the dorsal palpitations visible and the stigmata pale, with a black annulation, but with no other markings either on the head, body, or legs.

Imago—Like *pyramidoides* in every particular except that the brown of front wings is almost uniformly spattered over, more or less suffusely, with pale-grayish spots, so that no regular marks appear. The costal marks are, however, tolerably distinct as in *pyramidoides*, and by careful examination and comparison traces of the more conspicuous marks of that species may be discerned.

Described from one ♀ bred July 31.—[Third Rept., p. 75.

As remarked at the time, the specimen from which the description was made was a bred one and perfect. Grote, in his *List of Noctuidæ*, considers it simply an aberration of *pyramidoides*, but this can hardly be the case, as the larva also shows differences.

AGROTIS SCANDENS, N. Sp.—*Larva.*—Average length when full grown 1.40 [inch, =35^{mm}]. Ground-color very light yellowish gray, variegated with glaucous in the shape of different sized patches, which are distinctly see nunder the lens to be separated by fine lines of the light ground-color. A well-defined dorsal and less distinct

subdorsal and stigmatal line, caused by these patches becoming larger and darker; another and still less distinct line of the same kind under stigmata. The dorsal line frequently with a very fine white line along its middle, especially at sutures of segments. Piliferous spots in the normal position; those above black, those at the sides lighter. Stigmata black. Head and cervical shield tawny, the latter with a small black spot each side, the former with two in front, and two eye-spots each side. Caudal plate tawny, speckled with black. Venter and legs glaucous. Bristles fine and small. Filled with food it wears a much greener appearance than otherwise, while when young it is of a more uniform dirty whitish-yellow, the lines less distinct but the piliferous spots proportionately larger. Head quite variable in depth of shade.

Perfect Insect.—Average length 0.70 [inch, = 17.5^{mm}]; alar expanse 1.50 [inch, = 37^{mm}]. General color of fore wings very light pearly bluish-gray, with a perceptible deepening posteriorly. Quite variable, sometimes of a more decided blue, at others inclining to buff as in *Leucania unipuncta*, Haw. Markings, when distinct, as in Plate 1, Figures 5 and 6. With the exception of the reniform spot and subterminal line, however, they are usually distinct only on costa, being either indistinct or entirely obsolete on the rest of the wing. The subterminal line is light, with a more or less dark diffuse shade each side, which, in some instances, forms into sagittate spots. A black stain at the lower part of reniform spot forms a most distinctive character. Hind wings very pale and lacking the bluish cast of fore wings; lunule distinct, and a dark shade, enclosing a lighter mark, as in *Heliothis*, along posterior margin. Eyes dark; head and thorax same as fore wings; abdomen same as hind wings. The whole under surface the same as hind wings above, the lunules and arcuated bands faintly traced, the fore wings having a darker shade in the middle.

Described from 30 bred specimens.—[First Rept., pp. 78–79. Pl. 1, Figs. 5, 6.

AGROTIS COCHRANII, Riley—*Imago.*—Fore wings of a light warm cinereous, shaded with vandyke brown and umber, the terminal space, except at apex, being darker and smoky. Basal, middle and limbal areas of almost equal width, the middle exceeding somewhat the others. A geminate dark basal half-line, usually quite distinct. Transverse anterior geminate, dark, somewhat irregularly undulate, and slightly obliquing outwards from costa to interior margin. Transverse posterior geminate, the inner line being dark, distinct and regularly undulate between the nerves, while the outer line is plain and much paler; it is arcuated superiorly and inversely obliques for two-thirds its width. Orbicular and reniform spots of normal shape, having a fine, dark annulation, which is however obsolete in both, anteriorly; the orbicular is concolorous with the wing, whilst the reniform has a dark inner shade with a central light one, and forms with the transverse posterior a somewhat oval spot which is also dark. Median shade dark and distinct interiorly, shading off and becoming indistinct in center of wing, and quite dark between the two spots, giving them a fair relief. Subterminal line single, light, acutely and irregularly dentate, with an inner dark shade, but warmer than that of terminal space. Terminal line very fine, almost black, slightly undulate. Fringes of same color as wing, with a light central line, having an outer dark coincident shade. A dark costal spot in basal area; at termini of the usual lines, and two light ones in subterminal space. In some specimens one or two fine dark sagittate marks are discernable, and also a fine black claviform mark. Hind wings: whitish, with a darker shade along posterior margin. Under surface of fore wings somewhat lighter than the upper surface and pearlaceous interiorly, with a smoky arcuated band—more definite near the costa than elsewhere—and a tolerably distinct lunule. Under surface of hind wings concolorous; slightly irrorate with brown anteriorly and posteriorly, and with an indistinct lunule and band. Antennæ, prothorax, thorax, tegulæ and body of same color as primaries, the prothorax having a darker central line, and in common with the tegulæ a carneous margin. Under surface lighter; legs with the tarsi spotted.

This moth, in its general appearance, bears a great resemblance to *Hadena chenopodii*, but the two are found to differ essentially when compared. From specimens of *H.*

chenopodii, kindly furnished me by Mr. Walsh, and named by Grote, I am enabled to give the essential differences, which are: 1st. In *A. Cochranii*, as already stated, the middle area exceeds somewhat in width either of the other two, while in *H. chenopodii* it is but half as wide as either. 2d. In the *Agrotis* the space between the spots and between the reniform and transverse posterior is dark, relieving the spots and giving them a light appearance, whilst in the *Hadena* this space is of the same color as the wing, and the reniform spot is dark. The claviform spot in the *Hadena* is also quite prominent, and one of its distinctive features, while in the *Agrotis* it is just about obsolete.

There are specimens that seem to be intermediate between these two, but all those bred by me, both male and female, were quite constant in their markings, and their intermediates will doubtless prove to be distinct species or mere varieties.

Larva—Length 1.07 inches [=26.8^{mm}]. Slightly shagreened. General color, dingy ash-gray, with lighter or darker shadings. Dorsum light, inclining to flesh color, with a darker dingy line along its middle. The sides, particularly along the sub-dorsal line are of a darker shade. On each segment there are eight small, black, shiny, slightly elevated points, having the appearance of black sealing-wax, from each of which originates a small black bristle. The stigmata are of the same black color, and one of the black spots is placed quite close to them anteriorly. Head shiny and of the same dingy color as the body, with two darker marks, thick and almost joining at the upper surface, becoming thinner below and diverging toward the palpi. The upper surface of first segment is also shiny like the head. Ventral region of the same dingy color, but lighter, having a greenish tinge anteriorly and inclining to yellow under the anal segment. Legs of same color. It has a few short bristles on the anterior and posterior segments.

Chrysalis.—Length 0.70 of an inch [=17.5^{mm}]. Light yellowish brown with a dusky line along top of abdomen. Joints, especially of the three segments immediately behind the wing-sheaths, dark brown. The brown part of these three segments, minutely punctured on the back. Eyes dark brown, and just above them, a smaller brownish spot. Two quite minute bristles at extremity.

Described from numerous bred specimens. —[First Rept., pp. 75–76. Fig. 26.

There is little question but that this is the moth briefly characterized by Harris (Ins. Inj. to Veg., p. 444) as *Agrotis messoria*, an examination of the types confirming this view. *A. repentis* G. & R. and *A. lycarum* are also conceded by Grote to be synonyms.

PLUSIA BRASSICÆ, N. Sp. —*Larva*—Pale yellowish translucent green, the dorsum made lighter and less translucent by longitudinal opaque lines of a whitish-green; these consist each side, of a rather dark vesicular dorsal line, and of two very fine light lines, with an intermediate broad one. Tapers gradually from segments 1–10, descending abruptly from 11 to extremity. Piliferous spots white, giving rise to hairs, sometimes black, sometimes light colored; and laterally a few scattering white specks in addition to these spots. A rather indistinct narrow, pale stigmatal line, with a darker shade above it. Head and legs translucent yellowish-green, the head having five minute black eyelets each side, which are not readily noticed with the naked eye. Some specimens are of a beautiful emerald-green, and lack entirely the pale longitudinal lines. Described from numerous specimens.

Chrysalis—Of the normal *Plusia*-form, and varying from yellowish-green to brown.

Moth—*Front wings* dark gray inclining to brown, the basal half line, transverse anterior, transverse posterior, and subterminal lines pale yellow inclining to fulvous, irregularly undulate, and relieved more or less by deep brown margins; the undulations of the subterminal line more acuminate than in the others, and forming some dark sagittate points; the basal half-line, the transverse anterior near costa, and the transverse posterior its whole length, being sometimes obscurely double: four distinct equidistant costal spots on the terminal half of wing, the third from apex formed by

the termination of the transverse posterior; posterior border undulate with a dark brown line which is sometimes marked with pale crescents; a series of similar crescents (often mere dots) just inside the terminal space; the small sub-cellulary silver spot oval, sometimes uniformly silvery-white but more often with a fulvous centre, sometimes free from, but more often attached to the larger one which has the shape of a constricted U, very generally with a fulvous mark inside, which extends basally to the transverse anterior at costa. Fringes dentate, of the color of the wing, and with a single undulating line parallel to that on the terminal border. *Hind wings* fuliginous, inclining to yellowish towards base, and with but a slight pearly lustre; fringes very pale with a darker inner line. Under surfaces pale fuliginous with a pearly lustre, the front wings with a distinct fulvous mark under the sub-cellulary spots, speckled more or less with the same color around the borders of the wing, the fringes being dentate with light and dark; the hind wings speckled with fulvous on their basal half, and with the fringes as above. *Thorax* variegated with the same color as front wings, the tufts being fulvous inclining to pink. *Abdomen* ♀ gray, with a few pale hairs near the base, and scarcely extending beyond the margin of the hind wings; ♂ longer, covered with pale silky hairs, a distinct dorsal brown tuft on each of the three basal segments, and two large lateral either fawn-colored or golden-yellow brushes on the fifth segment, meeting on the back and partly covering two smaller brushes on the sixth, which are tipped with black; terminal segment flattened and with two lateral more dusky and smaller tufts: underside of thorax and abdomen gray, mixed with flesh-color. Alar expanse 1.55 inches. Described from numerous bred specimens. In a suite of specimens bred from the same brood of larvæ a considerable difference in the general depth of color is found, some being fully as dark again as others.

Closely resembles *Plusia ni*, Engr., which occurs in Italy, Sicily, France, and the northern parts of America. Mr. P. Zeller of Stettin, Prussia, to whom I sent specimens, considers it distinct however from the European *ni*, and I have consequently given it a name in accordance with its habits. — [Second Rept., pp. 111–112. Fig. 81.

Notwithstanding its close resemblance to *ni*, the best authorities agree with Zeller in considering it distinct, as it certainly is. Strangely enough this same *brassicæ*, or what is extremely close to it, occurs also in South Europe and is figured in Stainton's *Entomologist's Annual* for 1870 as *P. ni*, one specimen having been found on the south coast of England, which specimen Zeller, as he wrote me, believes to have come from America. Staudinger would probably characterize *brassicæ* as a "species Darwiniana," and there are doubtless individuals of both the species which approach each other so closely as to be undistinguishable. There is such variation in the silver spot in either that it cannot be depended on alone, but Speyer (Europäisch-Americanische Verwandtschaften; *Stettiner Ent. Zeit.*, June, 1875, p. 165) has presented other differences that are constant in detail, the most noticeable of which are the darker and more irrorate coloring and the interrupted and wavy terminal line of *brassicæ*, against the paler, smoother, more metallic coloring and the perfectly straight and unbroken terminal line of *ni*.

The larva is the most common cabbage pest in the Southern States, and is infested with an undetermined parasite. Mr. E. A. Popenoe has found it feeding on the leaves of *Crepis*, and what appears to be the same has been found by my assistants on Clover, Dandelion, *Senecio scandens*, and *Chenopodium*.

APLODES RUBIVORA, N. Sp. — *Larva* — Average length 0.80 inch [= 20^{mm}]. Color light yellowish-gray, darker just behind each joint, and very minutely shagreened all over. On each segment a prominent pointed straight projection each side of dorsum, and several minor warts and prickles below. Two very slightly raised, longitudinal lighter lines along dorsum, between the prominent prickles. Ten legs.

Perfect insect — Alar expanse 0.50 inch [= 12.5^{mm}]; length of body 0.25 inch [= 6^{mm}]. Color verdigris-green, the scales being sparse so that the wings appear sub-hyaline. Fore-wings with two transverse lighter lines dividing the wing into three parts, proportionate in width as 3, 4, 2 counting from base, and parallel with posterior margin; also a faint line between these two, running to about $\frac{1}{3}$ of wing from costa. Hind wings with two similar transverse lines, dividing the wing in like proportion, the outer line not parallel with margin, but wavy and produced posteriorly near its middle. Costa pale; fringes obsolete. Head, thorax and abdomen green above, but, together with antennæ and palpi, white beneath.

Described from one ♀ specimen. — [First Rept., pp. 139–140. Pl. II, Fig. 25.

Dr. Packard, in his Monograph of the Geometred Moths, etc. (U. S. Geol. Surv. of Terr., Vol. X, 1876, p. 382), refers it to the genus *Synchlora* Gor., and adds the conventional ending to the specific name, so that the species becomes *Synchlora rubivoraria*. *Synchlora albolineata* Pack. and *Eunemoria gracilaria* Pack. are given as synonyms.

PHYCITA [ACROBASIS] NEBULO, Walsh—*Imago*.—I reproduce here the description of the moth in Mr. Walsh's original words: "Expansion of wings 7-10. Length of body 3-10. General color light cinereous, varied with dusky. A row of about seven subsemilunar or linear dark spots on outer margin of fore wing. Then one-fourth of the distance to the body a waving light cinereous band parallel to the exterior margin, marked on each side with dusky black. Nearly at the centre a much abbreviated black band. Beyond the centre on the costal margin a subtriangular dusky black spot, the apex of which connects with the apex of a much larger subobsolete triangular brick-red spot which extends to the interior margin, and is bounded on the outside by a wavy light cinereous band, which is again bounded by a wavy dusky black band proceeding from the apex of the costal triangle. Base of wing dusky black, inclosing a small round light cinereous spot. Hind wings and all beneath light cinereous shaded with dusky, the fore wings darker. Tarsi dusky with a narrow light cinereous fascia at the apex of each joint. Hind tibia fasciate with dusky at the apex, sometimes obscurely bifasciate. Intermediate tibia fasciate with dusky at the centre, the fascia generally extending to the base, but becoming lighter. Anterior tibia dusky, with a narrow apical light cinereous fascia. Palpi, both labial and maxillary, dusky."

When compared with other closely allied and resembling species, this little moth may be characterized in the following manner: The ground color of the front wing is decidedly bright and pale; the discal spots are almost always confluent, thus forming an abbreviated transverse bar; the dark markings are well defined and the triangular dark costal spots starting from the inner third of the wing is distinctly relieved, while the "brick-red" (nearer a cinnamon-brown) triangular spot which opposes it is large, so that the space it occupies on the inner margin is nearly as wide (generally within one-third) as that between it and the transverse posterior line. The lower half of the basal space is often of a distinct cinnamon-brown, and an oblique dusky band, which Mr. Walsh has not mentioned, is often quite distinct, running from near the apex to the brown triangle, where it connects with the inner margin. The species recalls, in facies, the European *Myelois suavella*. In a suite of specimens bred from Apple, Quince, Plum and Cherry, there is sufficient variation to prevent a too rigidly drawn description, but the above characters obtain in all of them, and such variation as occurs runs in the direction of the variety presently to be described.

Larva—[Length 0.5 inch] Brown or greenish in color. Cylindrical. Tapering grad-

ually from first to last joint. Head and cervical shield darker than the rest of body, slightly shagreened, sparsely covered with long hairs, the shield quite large, convex, and occupying the whole surface between stigmata—there being in front of the latter a sub-cervical dark horny plate. Joints 2 and 3 wrinkled as at Fig. 18, *c* the former with two rather conspicuous dark dorsal piliferous spots. The other joints with a few fine hairs, the stigmata plainly visible, and the anal covering but slightly horny. Legs and prolegs of moderate size and of same color as body.

Described from numerous specimens.

Chrysalis—Mahogony-brown, with no striking character. Abdomen, especially above, with very minute punctures.

VARIETY NEBULELLA (Fig. 20, *e*).—I have bred a single specimen from wild Crab (*Cratægus*) which differs in some essential features from the normal form, but which nevertheless can only be considered a variety of it, as I observed no larval differences. It differs in the more uniform and subdued tone of the front wings, the markings being more suffused and indistinct; but principally in the relative narrowness of the space outside the transverse posterior line the greater consequent width of the middle area, and smallness of the triangular brown spot—the space it occupies on the inner margin being scarcely one-half as wide as that between it and the transverse posterior line. The discal spots are also separated.

Described from one good specimen. An interesting fact connected with this variety is, that precisely the same form occurs in Europe, as I found a single specimen in the cabinet of M. J. Lichtenstein of Montpellier, France, which he had captured in that vicinity, and which he allowed me to bring home for comparison. It seems to be rare, even there, and whether indigenous or imported from this country, is a question yet to be solved.—[Fourth Rept., p. 41-42, Figs. 18, 19, 20.

ACROBASIS JUGLANDIS, LeBaron.—(Fig. 20, *d*)—I have bred this species from Hickory, but as Dr. LeBaron has also bred it abundantly from Walnut, and has signified his intention of describing it in his second annual Report, I adopt his proposed name, and shall content myself with pointing out the manner in which it may generally be distinguished from *nebulo*. Firstly, by the paler basal area of the front wings, which is sometimes almost white, especially near the costa, and by the head and shoulders and sometimes the ♂ antennal horn partaking of this paler color. Secondly, by the darker median space, the dark triangular costal spot not being well relieved posteriorly, but extending so as sometimes to darken the whole space. Thirdly, by the discal spots always being well separated.

Such are its specific characters as taken from 3 hickory-bred and 6 walnut-bred specimens; but of the former there is 1 which when placed alongside of some of the more abnormal specimens of *nebulo*, can scarcely be distinguished from them, and, if chosen without knowledge of its larva, would certainly be placed with them; while of the latter there are two which nearly as closely resemble the variety *nebulella*. In general characters, in the size of the brown triangular spot, and the manner in which the inner margin is divided, *juglandis* is intermediate between *nebulo* and *nebulella*. In one of the hickory-bred specimens, the general color is quite warm, and the basal area carneous rather than white.—[Fourth Rept., p. 43. Fig. 20, *a*, *b*, *d*.

Dr. LeBaron published his description of it about the same time, under the name *Phycita juglandis*, in his Second Report on the Insects of Illinois, p. 123.

PEMPELIA HAMMONDI, N. Sp. *Imago* (Fig. 21, *d*).—Average expanse 0.48 inch [=12^{mm}]. Front wings glossy purplish-brown with two silvery gray transverse bands dividing the wing on costa in about three equal parts, the basal band sharply defined outwardly and always extending to inner margin, the posterior band never extending more than half way across the wing, and generally not more than one-third, illy defined. In some specimens the basal transverse band is quite narrow, with the basal space a shade paler than the median: in others the band forms a double line. In some

specimens also, a narrow pale transverse line outside the second hand, and a pale terminal shade, are visible. Hind wings uniformly paler gray. Under surface glossy gray, with no marks, the front wings a shade darker than the hind. ♂ differs from ♀ in the basal portion of the antennæ being curved, and the curve filled with a tuft of scales.

Described from numerous bred specimens. The species has the general facies of the European *Cryptoblabes bistriga*, which is a larger insect.

Larva.—Length 0.45—0.50 inch [=11—12.5^{mm}]. General color olive, or pale green, or brown, with a broad dark stripe along each side of back. Tapers slightly both ways, joints 4-12 inclusive, divided into two transverse folds. Freckled with numerous pale specks and with piliferous spots, the specks often taking the form of two pale broken lines along the upper edge of dark stripe. The piliferous spots are pale with a central black dot, and are best seen in the dark specimens. On joints 4-12 inclusive they are placed 4 in a square on the middle of the back, and four more each side, the two upper lateral ones being on the anterior fold, the stigmata appearing as minute rufous specks between them. Both these spots are often double. The third lateral spot is on the posterior fold and the fourth is subventral and anterior. The hairs proceeding from these spots are long and setaceous. Head horizontal, freckled, pale behind, tinged with green in front and with a few long hairs. Joint 1 also freckled and with a large black piliferous tubercle with a pale basal annulation and in range with middie of dark stripe. Joint 2 with similar black tubercles with a white centre and replacing the uppermost lateral pale spot. There are but two of the small pale dorsal piliferous spots on this joint (between the tubercles) as well as on joint 3. Beneath immaculate, except that the thoracic legs have sometimes a few dusky dots.

In the very dark specimens the head, cervical shield and anal plate remain pale. The cervical shield is then well defined with four small piliferous specks at anterior edge, and the large shiny tubercle forms the extreme anterior angle.

Described from numerous specimens.

Pupa.—0.24 inch [=6^{mm}] long; rather stout and short, with two minute diverging spines and a few stiff bristles at tip.

In many specimens the subdorsal dark stripe is obsolete or sub-obsolete, but even then the four black tubercles on joints 1 and 2 characterize the larva sufficiently.—[Fourth Rept., p. 46. Fig. 21.

TORTRIX RILEYANA, Grote—*Larva*—Length, Hickory feeding, 0.60-0.80 inch [=15—20^{mm}]; Snowberry feeding, 0.40-0.50 inch [=10—12.5^{mm}]. Largest on segment 2, tapering thence gradually to anus. Ground color dull yellow. Covered with large, distinct, black, sealing-wax-like, slightly elevated spots, each giving rise to several fine bristles. These spots are thus arranged on each segment: 2 each side of dorsum the posterior ones widest apart; 1 at sides in the middle of the segment, containing the stigmata in its lower hind margin; 1 smaller and narrower just below this, on a somewhat elevated longitudinal ridge, and 1 round one below this ridge on the posterior part of the segment. Segments 2 and 3 have but one spot each side of dorsum. Two distinct wrinkles on all the segments, more on 2 and 3. Head, cervical shield, and caudal plate black. Venter dirty yellow with black marks; legs ditto.

Chrysalis—Honey-yellow, robust in the middle, and with two transverse rows of minute teeth across the back of each segment.

Perfect Insect—From Hickory—Average expanse 1 inch, length of body, 0.35 [=8.8^{mm}]. Deep ochreous. Fore wings evenly washed with purplish, leaving the fringes and costal edge dark ochreous. The markings take the shape of dark velvety brown rounded maculations, generally of small size and faintly shaded with ochreous on the edges. Three of these subterminally at the base of the wing, subequal, situated interspaceally between the nervures. At a little within the middle of the costa are two fused maculations, the most prominent. Before and beyond these, some faint costal marks. At the extremity of the discal cell, above median nervure, is the first of a

series of maculations, normally four in number but not constant, usually uneven in size. A subterminal series of spots is inaugurated on costa by a large, compound shaded maculation. Below this, over the median nervules, sweeps an outwardly rounded series of small approximate dots. Two dots on costa, within and at the apex, and a faint terminal series of minute streaks is shortly discontinued. Hind wings of a lustrous bright deep ochreous; pale along the costal margin and darker shaded along internal margin. Beneath, as are the hind wings above; both wings immaculate, fore wings the darker. Body and appendages concolorous, bright deep ochreous. Antennæ simple. Numerous bred specimens.

From Snowberry—var. symphoricarpi—Much paler, the fore wings not being as dark as the hind wings of the above. The upper surface of fore wings not washed with purplish but merely of a darker ochreous than the hind wing. The maculations entirely similar but ferruginous, paler and the slighter costal marks obsolete. Legs at base and under thoracic surface almost whitish. Average expanse, 0.62 [=15.5^{mm}]; length of body, 0.30 [=7.5^{mm}]. Described from numerous specimens. Under surfaces exactly alike in both varieties.—[First Rept., p. 154. Fig. 85, and Pl. 2, Figs. 3, 4.

TORTRIX CINDERELLA, N. Sp.—*Imago.*—Alar expanse exactly 1-2 inch [=12.5^{mm}]. Front wings deep glossy ash-gray, immaculate. Under a lens they have an irrorate appearance, while in certain lights some of the scales appear to form a series of darker transverse sinuous lines. Also scattered over the wing may be noticed a dozen or more reddish scales, which are not sufficient, however, to destroy the uniform immaculate appearance. Head, mouth-parts, antennæ, legs, and abdomen of same color. Hind wings paler and semi-transparent. Fringes of all wings concolorous. Under surface of wings pale nacreous, inclining to pale fulvous around the margins.

Described from two bred specimens.

Larva (Fig. 22, *a*).—Length 0.50 inch [=12.5^{mm}]. Form of that of *Acrobasis nebulo*, wrinkled very much in the same manner. Color yellowish-green, the piliferous spots of the same color, but readily distinguished by their polished surface; they are placed in a transverse row on thoracic joints, and on joints 4—12 there are four trapezoidally on dorsum, two laterally on the first fold and one subventral. Stigmata between the two lateral spots, and yellowish. Head and cervical shield gamboge-yellow; only a shade darker than body; labrum and two basal joints of antennæ paler or white, the terminal joint brown; ocelli on a somewhat crescent-shaped black spot (the most conspicuous character) a second dusky spot at base of head laterally. Legs immaculate.

Described from many specimens.

Pupa (Fig. 22, *b*).—Length 0.25—0.30 inch [=6 —7.5^{mm}]. Brown, characterized by a peculiar rounded projection from front of head; by a little pointed prominence at base of each antennæ, and each side of penultimate abdominal joint; and by terminating in a broad suppressed piece which produces two decurved hooks. Posterior rim of abdominal joints rasped dorsally, and a slight rasped dorsal ridge near the anterior edge of larger joints. Legs reaching only to end of wing-sheaths. The head-prominence varies in size and slightly in form.—[Fourth Rept., p. 47.

From specimens reared from cranberry-feeding larvæ received from Mr. Jno. H. Brakeley, of Bordentown, N. J., I am satisfied that this is the same species briefly characterized by Packard in the 1st edition of his *Guide* (p. 334) as *Tortrix oxycoccana*, and that *T. malivorana* LeBaron (my Rep. IV, p. 47) is but a dimorphic orange form, subsequently described by Packard as *T. vacciniivorana* (Hayden's Report of the U. S. Geol. and Geogr. Survey of the Territories 1878, p. 522). The orange and ash-gray specimens are thus bred both from Apple and Cranberry. I have reared both forms from Cranberry and from Apple, and they are undistinguishable in the larva and pupa states. The gray form is often

more or less suffused with orange scales and the orange form less frequently with gray scales. This is the most remarkable case of dimorphism with which I am familiar in the family, and points strongly to the important bearing of biological facts on a true classification. The dimorphic coloring is not sexual, but occurs in both sexes. The eggs of this species are very flat, circular and translucent, with a diameter of 0.7^{mm}, and are laid singly on the underside of the leaf near the mid rib. The species belongs to the genus *Teras*, and as Packard's specific name *oxycoccana* has priority, the insect should be known as *Teras oxycoccana*, Pack. The insect, according to Mr. Brakeley, who gives an account of it in the Report of the Seventh Annual Convention of the New Jersey Cranberry Association (1879, p. 7), commonly affects, also, the high-bush whortleberry. The gray form of the moth is most frequent in autumn.

GELECHIA GALLÆSOLIDAGINIS, N. Sp.—*Larva.*—Length 0.60 [inch, = 15^{mm}]. Cylindrical. Color dark dull-brown, without shine. Largest on middle segments; tapering from 4th to head, and from 9th to extremity. Each segment impressed transversely in the middle, thus forming two folds, the thoracic segment having other such folds. Six small piliferous spots, two each side of dorsum and one above stigmata, which, together with the stigmata, are shiny and of a lighter brown than the body. Head and cervical shield light shiny-brown.

Chrysalis.—Length 0.50 [inch, = 12.5^{mm}]. Mahogany-brown. Form normal. Blunt at extremity.

Perfect moth.—Average length 0.38 [= 9.5^{mm}]. Alar expanse ♀ 0.95 [inch, = 24^{mm}], ♂ 0.75 [inch, = 18.8^{mm}]. Fore wings deep purplish-brown, more or less sprinkled with carneous. A light carneous band starts from the costa near the base, and curves towards the middle of the inner margin, which it occupies to a little beyond the beginning of the cilia, where it curves upwards towards the tip, reaching only half way up the wing. Here it is approached from above by a somewhat diffuse spot of the same color, which starts from the costa just behind the apex, and runs down to the middle of the wing.

In the plainly marked individuals there is an extra line running from the middle of the inner margin, outwardly obliquing to the middle of the wing, and then back to the inner margin a little beyond where the cilia commences, but in the great majority of specimens this mark is indistinct. Cilia light carneous. Hind wings slate-gray, with the cilia lighter. Antennæ finely annulated with the same two dark and light colors. Head, thorax and palpi light, with a sprinkling of the dark brown. Body dark, with light annulations. The species varies in the distinctness of its markings, and the light parts of the front wing appear finely sprinkled with brown under the lens. Male generally smaller than female, with the antennæ proportionately a little longer.

Described from numerous bred specimens.

It seems to resemble *G. longifasciella* of Clemens, in coloration and pattern; but unfortunately our late lamented microlepidopterist, failed almost always to give the measurement of the species he described, and it is impossible to tell how much mine resembles that species. Yet, as *longifasciella* was described from two mutilated specimens, received from A. S. Packard, jr., and as that gentleman has seen my insect and declared it an undescribed species, there can be little doubt of the fact.—[First Rept., p. 175. Pl. II, Figs. 1, 2, 5.

PTEROPHORUS CARDUI, N. Sp.—*Larva.*—Average length 0.60. Largest in the middle of body, tapering thence each way. Color light straw-yellow—greener when young. Somewhat darker, partly translucent, dorsal, subdorsal and stigmatal lines. Two lateral rows of black spots, the lower spots rather smaller and placed behind the

upper ones. A third row above these, and others along the back, but so small that they are generally imperceptible with the naked eye, except on the thoracic segments, being especially distinct on segment 2. Head small, black, sometimes inclining to brown. Cervical shield black, divided longitudinally in the middle by a lighter line. Caudal plate also black. Segment 11, besides the spots above mentioned, has two transverse black marks, the posterior one the largest. Thoracic legs black, the others of the same color as the body.

Described from 12 specimens.

Pupa.—Average length 0.45. Of form of Plate 2, Fig. 14. Soft, dull yellow, with a lateral dusky line each side of dorsum, and another, less distinct, each side of venter. Also dusky about the head and wing-sheaths.

Perfect insect.—Length 0.45; alar expanse 0.80. Front wings bifid, the cleft reaching not much more than $\frac{1}{4}$ of wing; tawny yellow, with a distinct dark brown triangular spot running from costa to the base of cleft—sometimes a little below it—its posterior margin with a slight concave curve. Three dusky, diffuse longitudinal spots, one placed on the basal third of the wing at costa and frequently reaching along the costa to the triangular spot; one near the interior margin, a little nearer to the base of wing than the last, and one on the outer third of the interior margin. Two light-colored transverse lines across the end of wing, one very near and parallel with posterior margin, the other bordering the triangular spot behind, and curving across the lower lobe towards posterior angle. The space between these two light lines usually darker than the ground-color. Fringes dark with a light margin. Hind wings trifid, the upper cleft reaching a little beyond the middle, the lower one to the base of wing. Color ashy-brown, the lower lobe produced into a dark angular spot about their middle posteriorly. Antennæ, palpi, head, thorax, and body, tawny yellow; legs of the same color with the exception of the tarsi, which are almost white, with alternate dark brown spots, the spines being black, with dusky tips.—[First Rept., pp. 180–181. Fig. 98, and Pl. II, Figs. 13, 14.

Zeller has since (1872) referred it to the genus *Platyptilia* (Beitr. zur Kenntn. N. A. Nachtfalter, 2nd part, p. 118), and indicates the difference between it and a very closely allied European species, *P. Zetterstedtii.* He very properly, because of the incongruous compound, drops the conventional ending *dactylus* which I used in the original description.

HETEROPTERA.

NYSIUS DESTRUCTOR, N. Sp.—General color grayish-brown; of shape of *N. thymi* Wolff. *Head* either minutely or more coarsely punctate, and more or less distinctly pubescent; the surface usually brown, with a distinct black, longitudinal line each side, broadening on the crown, but generally leaving the orbit of the eyes pale; these lines sometimes more diffuse and occupying the whole surface, except a median brown spot at base of crown, and a narrow, paler spot on the clypeus; ocelli piceous; eyes opaque, either black or slate-color; face sometimes uniformly pubescent and appearing dark grayish-brown; but more generally black each side of rostrum, with a distinct yellowish-brown spot on the cheeks below the eyes; rostrum piceous, paler at base and reaching to hind coxæ; antennæ either pale yellowish-brown or darker brown, the torulus and first joint darkest. *Thorax*, pronotum narrowing anteriorly, the sides slightly sinuate, irregularly and more coarsely punctate than the head, more or less pubescent, dingy yellow or brown, with a transverse black band near the anterior edge, obscuring the incision and leaving the edge pale, especially in the middle, where there is often a conspicuous pale spot; also five more or less distinct longitudinal dark lines, the central one most persistent and leading on the posterior margin to a pale, shiny, impunctate spot; the callus at hind angles, and sometimes an intermediate spot between it and the median one, and the entire posterior margin, also pale and impunctate; scutellum dark, coarsely punctate, sometimes with a smooth median lon-

gitudinal ridge ending in a pale spot, and with the lateral margins pale; prosternum dark, more or less pubescent, the anterior and posterior margins, and a band outside of coxæ, more or less broadly pale; mesosternum and metasternum also dark, with the pale spots outside of coxæ. *Legs* pale yellow, inclining more or less to brown; coxæ dark at base, pale at tip; trochanters pale; front and middle femora spotted more or less confluently on the outside with brown; hind femora, ♂ dark brown, except at tips and base; ♀ spotted only; tibiæ ringed with brown at base; tarsi marked more or less with brown, especially at tip. *Hemelytra* either colorless, transparent and prismatic, or distinctly tinged with dingy yellow; shallowly punctate and very finely pubescent, the veins of corium and clavus dingy yellow, with brown streaks, the more constant of these streaks being two on posterior margin of corium, and one at the tip of clavus. *Abdomen*, ♂ tergum piceous, with the sutures and sides of some of the joints rarely paler; venter piceous, minutely and regularly covered with gray pubescence; ♀ sutures and spots on tergum more often pale; venter dingy yellow, except at base; ♀ paler than ♂, and generally larger. Average length 0.13 inch [= $3.\frac{1}{4}^{mm}$].

Larva.—Dingy yellow, with more or less distinct longitudinal dark lines, especially on head.

Pupa.—Same color, with more distinct red and brown longitudinal lines, and two little tooth-like, pale yellow processes at inner base of hemelytra pads, indicating the wings; the abdomen paler than the rest of the body.

Described from numerous specimens. I have some, especially males, in which the black so predominates that the paler parts of the head and thorax are scarcely traceable, while in others again the pale parts predominate almost to the exclusion of the black. Indeed, so variable is the species that it is difficult to see wherein some of the specimens differ from the European *thymi*, or from *N. angustatus* Uhler, and it is barely possible that future comparison will show specific identity between some or all of the three. But as long as authors fail to give the variation a species is liable to, or the number of specimens a description is drawn up from, it will remain impossible to decide such questions satisfactorily, and I name *destructor* at the suggestion of our Hemipterist, Mr. P. R. Uhler, of Baltimore, who has examined specimens which I sent him.—[Fifth Rept., p. 113. Fig. 41.

MYTILASPIS POMICORTICIS, N. SP.—*Eggs*—from 30 to 100 under each scale; length scarcely 0.01 inch, irregularly ovoid, nearly thrice as long as wide, snow-white, except just prior to hatching, when they become yellowish. *Larva*—Length of body 0.01 inch, ovoid, thrice as long as wide, pale yellow, with a darker yellow spot near each end; a few short hairs seen around border; two fine anal setæ about half as long as body springing from two lobes between which two spinous hairs are always seen; antennæ quite variable, the joints irregular and not easily resolved, sometimes appearing only 6-jointed, but more generally 7-jointed, with a few hairs, two or three at tip the longest and most persistent; legs with a one-jointed tarsus, a feeble claw, and, among other hairs, four more or less distinctly knobbed ones near tip, the two uppermost longest.

♂—Length of body, 0.022 inch [= $.5.5^{mm}$]; color, translucent carneous-gray; a dorsal transverse band on each abdominal joint, and portions of the mesothorax and metathorax darker, or purple-gray; the members somewhat lighter. *Head*, sub-triangular; rostrum rudimentary; ocular tubercles, one each side of it, plainly visible, the eyes on the upper surface prominent, dark, and with few facets; antennæ as long as body, 10-jointed, joints 1 and 2 bulbous and sometimes indistinctly separated; 3—9 about four times as long as wide, slightly constricted; 10 half as long and fusiform; all but basal two with a whorl of about eight hairs, slightly clavate and as long as width of joint. *Thorax* very large, oval; prothoracic portion narrowing in front, composed of two transverse folds, the anterior one having a transverse row of four dusky dots; the mesothoracic portion large and elevated, showing three lateral swellings; a well-defined medio-dorsal plate, rounded in front, shallowly-notched behind, with a medio-

longitudinal suture, and a transverse one dividing it in two, the anterior half pale, the posterior darker; the metathoracic portion showing a sub-triangular scutel, and separated from mesothorax by the transverse band (*apodema* of Targioni). *Wings* about as long as body, arising from base of mesothorax, spatulate, closing flat on back in repose, and appearing whitish, finely and uniformly covered with short, stiff hairs; supported by a bifurcate vein, the bifurcation arising from basal fourth, and each fork running near and almost parallel with the wing-margins; balancers dark, with the hook quite long. *Legs* with the middle pair longest, and—from large size of coxæ—further from front than from hind pair; the coxæ and femora large and swollen, the latter with a more or less distinct lobe near the base below; the tarsi one-jointed, with a constriction occasionally indicated, and terminating in a single flexible claw, surrounded by four clubbed hairs; the tibiæ and tarsi are quite bristly, but on the femora there are usually but two bristles, one about the middle above, and one on the basal lobe below; the coxæ also have one above. *Abdomen*, seen from above, nearly as long as thorax; appearing shorter from below; 8 joints only discerned; the last joint abruptly narrowed into a large tubercle bearing four bristles on the under side, and sending forth the genital armor in the form of an awl-shaped style as long as the abdomen.

♂ Scale—Larval part golden yellow; the anal shield yellowish-brown, sometimes quite pale, inclining to white, flattened, straight, rather more than twice the length of larval scale, increasing in width from tip to end, where it is slightly truncate; attached by a white film; average length, 0.035 inch.

♀—Average length, 0.05 inch; color, pale yellow; jug-shaped and flattened when young, more globular when mature, and twice as long as wide; the cephalo-thoracic portion rounded and entire, but narrower than the abdominal, at the juncture with which it forms a more or less conspicuous lateral projection; on its inferior side is a tubercle, having two longitudinal ridges, and giving rise to a corneous, filiform proboscis, longer than the body, and composed of four separate parts; posterior abdominal joints deeply lobed laterally, with two or three blunt, fleshy hairs to each lobe; anal plate gamboge-yellow, corneous, with an irregular border, presenting two larger, slightly tri-lobed, median projections, and one or more smaller ones each side, furnished with spinous hairs, two especially between the tri-lobed projections aforenamed; five more or less complete sets of secretors visible from below, arranged around anus in form of an arc, the median set with normally 10, the upper laterals 20, and the lower laterals 14; besides these, some six or more blunt tubes, and a series of shorter pointed ones, may be noticed along the border, and doubtless serve as secretors. (See Fig. 32 *b*.)

♀ Scale—Larval scale golden-yellow; median scale somewhat darker; anal shield varying from pale brown to deep purplish-gray, and generally of a color with the bark it is upon. The whole scale is often incanous, but the hoary film easily rubs off; it averages 0.12 inch in length, but is quite variable in form and size, being either straight or curved, narrow and strongly arched, or broad and flatter, but always rounded at the end; the white inferior laminæ at sides sometimes show distinctly from above, and give the appearance of a pale border.

The lice, whether ♂ or ♀, vary in appearance according to position and state of maturity. In making the foregoing descriptions and figures, I have taken what appeared the most natural positions, after examination of many specimens. The ♂ abdomen shrinks very much in drying, and the more detailed ♀ characters are variable. While the normal number of secretors in the middle set is never more than 10, I have sometimes found but 8 or 9; that of the upper laterals never surpasses 20, but may be as low as 15; while that of the lower laterals is more uniformly 14, though I have sometimes found 16, and at others 12. Opposite sets do not always contain the same number.—[Fifth Rept., pp. 95–96. Figs. 31, 32.

This is the species previously known as *Aspidiotus conchiformis*, or popularly as the Oyster-shell Bark-louse, and the reasons for separating it are given in the report.

ERIOSOMA ULMI, N. Sp.—Color dark blue. Length to tip of closed wings, exclusive of antennæ, 0.12 [inch, =3^{mm}]. Wings hyaline, three times as long as wide, and more pointed at the ends than in *E. pyri*. Costal and subcostal veins, and that bounding the stigma behind, robust and black. Discoidal veins together with the 3d forked and stigmal veins, all slender and black, the forked vein being as distinct to its base as are the others, with the fork but $\frac{1}{3}$ as long as the vein itself and curved in an opposite direction to the stigmal vein. Antennæ 6-jointed and of the same color as the body; joints 1, 2, 4, 5 and 6 of about equal length, joint 3 thrice as long as either. Legs of the same color as body.

The young lice are narrower and usually lighter colored than the mature individuals, varying from flesh or pink to various shades of blue and purple.—[First Rept., p. 124.

Professor Thomas (Trans. Ill. St. Hort. Soc., 1876, p. 191) has called it *Erisoma Rileyi** because of *ulmi* being preoccupied by an European species. It belongs to *Schizoneura*. For subsequent remarks see "Notes on the Aphididæ of the United States, etc., by C. V. Riley & J. Monell," (Bull. Hayden's U. S. Geol. & Geogr. Survey, Vol. V, No. 1, p. 3.)

DIPTERA.

ASILUS MISSOURIENSIS N. SP.—Alar expanse 1.85 [inches, =47^{mm}]; length of body 1.30 inches [=33^{mm}]. *Wings* transparent, with a smoky yellow tinge, more distinct around the veins, which are brown. *Head* pale yellow, sometimes brownish; moustache straw-yellow with a few stiff black hairs below; beard pale straw-yellow; crown very deeply excavated; base of the same pale yellow with short, stiff, yellowish hairs, and a crown of black ones near the border; eyes large, prominent, finely reticulated and almost black; antennæ, first joint black tipped with brown, cylindrical and hairy; second joint black, short, thick and rounded at tip, with a few stiff hairs; third joint as long as first, tapering each way, smooth, black and terminating in a long, brown bristle; proboscis black and nearly as long as face; neck with pale and black hairs. *Thorax* leaden-black, slightly opalescent with reddish brown at sides, more or less pubescent with pale yellow, especially laterally and posteriorly and in three narrow longitudinal dorsal lines which gradually approach towards metathorax; bearded at sides and behind with a few decurved black bristles, those behind interspersed with a few smaller pale hairs; scutel of the same color, with upward-curving, black bristles; halteres brown. *Abdomen*, ♂, general color dull leaden-yellow, with darker transverse bands at insections; the light color produced by a yellowish pubescence and numerous short close-lying yellow hairs, the dark bands produced by the absence of this covering at the borders of each segment; basal segment broad, bilobed, and with lateral black bristles; segments 6, 7, 8 and anal valves with a decided pink tint, especially 7; 8 but one-third as long as 7 above. ♀, broader, flatter, more polished and brassy, with no transverse darker bands, segments 7 and 8 polished black, the latter narrow and longer than any of the others; anus with a few black bristles. *Legs*, dull purple-brown, with black bristles; thighs very stout, the hind pair rather darker than the others, the two front pair of trochanters with long, yellowish hairs; pulvilli, generally fulvous.

Described from two ♂, and two ♀, all captured while sucking honey-bees. I have not access to Loew's descriptions, and cannot therefore compare it with already described species; but specimens have been sent to Dr. Wm. LeBaron, of Geneva, Illinois, and to Baron Osten Sacken, of New York, and both these gentlemen are unacquainted with it, and believe it to be new. In the well marked ♂ specimens, the body bears a general resemblance to that of *Trupanea* [*Promachus*] *vertebrata*, Say.—[Second Rept., pp. 122–123. Fig. 89.

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* By typographical error *Rilepi*.

Baron Osten Sacken has since placed this as a synonym of *Proctacanthus Milbertii* Macq. in the second edition of his Catalogue of the described Diptera of North America (1878), p. 81.

LYDELLA DORYPHORÆ, New Species.—Length 0.25 [=6mm]. Alar expense 0.48 [=12mm]. Antennæ black. Palpi fulvous. Face silvery white. Front silvery, tinted with pale golden-brown, with a broad middle stripe black. Thorax cinereous with imperfect black stripes. Abdomen black and silvery-ash, changing into each other when viewed from different angles. When viewed from above: first segment deep black with a posterior border of silver-ash very narrow in the middle, much widened laterally, but abbreviated at the sides of the abdomen. The other segments with the basal half silvery-ash, terminal half black. Legs black. Fourth longitudinal vein of the wings straight after the angle. Posterior transverse vein arcuate.

Described from numerous bred specimens.—[First Rept., pp. 111–112. Fig. 48.

This species is referred by Ostén Sacken to the genus *Exorista* of Schiner, *Lydella* not being received as a distinct genus. The name *Lydella* is used also for a genus of Acarina.

EXORISTA FLAVICAUDA, N. Sp.—Length 0.35 to 0.50 inch [=8.5–12.5mm]. *Head* broader than thorax; face, silvery-white, the cheeks inclining to yellow, with lateral black hairs extending to near the base of antennæ, and one stiffer and longer bristle at top of cheeks; front, dusky, ferruginous, with two rows of black converging bristles; divided by a broad depressed stripe of a brighter ferruginous color and without bristles; occiput bright ferruginous; labium ferruginous with hairs of same color; maxipalps rufous; eyes dark mahogany-brown, and *perfectly smooth;* antennæ, two basal joints rufous, with black hairs, third joint flattened, dusky, and thrice as long as second; seta, black; entire hinder part of head covered with dense white hairs. *Thorax*, more decidedly blue than in *leucaniæ*, *broader* (instead of narrower) in front than behind; the vittæ less distinct; scutel of same color as thorax. *Abdomen*, stout and more cylindrical than in *leucaniæ;* first joint dark bluish-gray; second, light bluish-gray, becoming darker along the middle, at sides and at lower border; third joint, like second above, but golden-gray at sides (no rufous); last joint *entirely* yellow or pale orange, with no other color and but few black bristles around anus. *Wings* more dusky than in *leucaniæ;* alulæ, opaque bluish-white. *Legs*, black; pulvilli pale yellow.

Described from one captured, 4 bred ♀. Space between eyes at occiput fully one-third the width of head.—[Second Rept., pp. 51–52. Fig. 18.

TACHINA [EXORISTA] PHYCITÆ, LeBaron—*Imago.*—Length, 0.20 inch [=5mm]. Antennæ black, third joint twice as long as the second; face silvery, without bristles at the sides; sides of the front silvery at the lower part, pale golden above; the middle black vitta occupying a little more than half of the width of the inter-ocular space; frontal bristles continued down the face to opposite the end of the second joint of antennæ; palpi blackish-brown; eyes hairy. Thorax black, with the ordinary cinereous stripes scarcely perceptible. Abdomen black, varied with cinereous at the base of the segments; a large fulvous spot on the side of the abdomen occupying nearly the whole of the side of the second segment, half or more of the third, and sometimes a small spot on the first; bristles on the middle as well as at the hind-margin of the second and third segments. Venation of the wings of the usual type; first posterior cell almost closed, before the end of wing; fourth long vein slightly curved after the angle; fifth long vein prolonged to the margin; hind cross vein moderately sinuous. Tarsal claws and pulvilli unusually long.

Female? A single specimen, a very little larger than the others, was obtained from the same lot of leaf-crumplers, which possibly may be the ♀ of the same species. It differs as follows: Front broader; antennæ dark brown; the cinereous markings of the body more distinct; the tip of abdomen fulvous, but without the fulvous spot at the sides; and with the tarsal claws of ordinary length.

This species appears to belong to the subgenus *Exorista* of Meigen, closely allied to *Tachina* proper, and differing from it chiefly in having the eyes hairy, and in the presence of bristles on the middle, as well as at the hind margin of the second and third abdominal segments, whereas *Tachina* has only the latter.—[Fourth Rept., p. 40–41.

This species was simultaneously published by Dr. LeBaron in his 2d Rept. Ins. Ill., p. 123. It is retained in *Exorista* by Osten Sacken.

ANTHOMYIA ZEAE ♀, N. Sp. (Pl. 2, Fig. 24). Length 0.20 [inch, =5^{mm}]; alar expanse 0.38 [inch, =9.5^{mm}]. Antennæ black; style microscopically pubescent; front, fulvous, with a distinct, rather narrow, brownish, cinereous margin; face and orbits brownish-white; palpi and proboscis black; ocellar area somewhat heart-shaped; thorax and abdomen pale yellow-brownish cinereous, with minute black points at the insertion of the bristles; thorax with an indistinct middle stripe of brown; legs black, tinted with cinereous; poisers pale ochre-yellow; scales small, the upper valve larger than the lower.—[First Rept., p. 155. Figs. 86, 87, and Pl. II, Fig. 24.

ANTHOMYIA RADICUM (Linn.) var. CALOPTENI—*Egg*—Oval, smooth, white, 0.04 inch long.

Larva—Skin unarmed, 0.24 inch [=6^{mm}] long when extended, of the normal form, the mandibular hooks black, quite conspicuous, and diverging at base. Prothoracic spiracles elongate. Anal spiracles minute, yellowish-brown, with the 8 fleshy surrounding tubercles, small.

Pupa—Pale-brown, rounded at each end, with the prothoracic spiracles and lips anteriorly, and the anal spiracles and lower tubercles posteriorly, showing as minute points.

Imago—♀. Average expanse 0.48 inch [=12^{mm}]. General color ash-gray with a ferruginous hue, especially above, and a more or less intense metallic reflection. Face with white reflections below; eyes smooth, brown, encircled by the ground color, and this behind and on forehead bordered by a brown line; 2 similar lines at back of head from upper corners of eyes and approaching to neck; forehead dusky-brown, becoming bright yellowish-red toward base of antennæ, and the brown forking at right angles around occiput. Trophi and antennæ black, the style simple and somewhat longer than the whole antennæ. Thorax with three dusky longitudinal lines, obsolete behind; legs black, with cinereous hue beneath; wings faintly smoky, with brown-black veins, the discal cross-vein straight and transverse, the outer one bent and more oblique; balancers crumpled, yellowish. Abdomen with faint dusty medio-dorsal spots, broad at base, tapering and obsolescing toward end of each joint.

In the ♂, aside from the larger eyes, stronger bristles, and narrower, less tapering abdomen with its additional joint—all characteristic of the sex—the face is whiter, and the medio-dorsal dark mark of abdomen continuous.

Described from 25 specimens of both sexes, reared from locust-egg-feeding larvæ.

Specimens bred from cabbage and radish roots, and others in my cabinet taken from the burrows (made in Osage Orange in Missouri) of *Crabro stirpicola* Pack.; do not differ specifically.—[Ninth Rept., p. 95.

For further details see First Rept. of the Commission (pp. 285–9), where the species is shown to be the *Anthomyia angustifrons* of Meigen.

ORTHOPTERA.

CALOPTENUS ATLANIS N. sp.—Length to tip of abdomen 0.70—0.85 inch [=17.5—21^{mm}]; to tip of closed wings 0.92—1.05 inches [=23—26^{mm}]. At once distinguished from *femur-rubrum* by the notched character of the anal abdominal joint in the male and by the shorter, less tapering cerci; also by the greater relative length of wings which extend, on an average, nearly one-third their length beyond the tip of the abdomen in the dried specimens; also by the larger and more distinct spot on the wings—in all which characters it much more closely resembles *spretus* than *femur-rubrum*.

From *spretus*, again, it is at once distinguished by the smaller size, the more distinct separation of the dark mark running from the eyes on the prothorax and of the pale line from base of wings to hind thigh; also by the anal joint in the ♂, tapering more suddenly and by the two lobes forming the notch being less marked. From both species it is distinguished not only by its smaller size but by the deeper, more livid color of the dark parts, and the paler yellow of the light parts—the colors thus more strongly contrasting.

6 ♂'s, ♀7's from New Hampshire. Just as the typical *femur-rubrum* is at once distinguished from the typical *spretus* by the characters indicated; so *Atlanis*, though structurally nearer to *spretus*, is distinguished from it at a glance by its much smaller size and darker, more marbled coloring. The contrast is all the greater in the living specimens, and I have seen no specimens of *spretus* that at all approach it in these respects.

Whether this is the *femur-rubrum* as defined by DeGeer or by Harris, it is almost impossible to decide, though Harris's figure of *femur-rubrum* better represents it than the true *femur-rubrum*, as subsequently defined by Thomas, and as found in Illinois and Missouri.—[Seventh Rept., pp. 169–170.

For further details and structural differences between it and *C. spretus* see First Report of the Commission.

LIST OF DESCRIPTIONS OF ADOLESCENT STATES.

In making out the following list of descriptions of adolescent states, etc., that appeared in the Reports, the nomenclature there used is retained. Unless otherwise stated the insects, in the particular states indicated, were at the time unknown or undescribed, the descriptions first appearing in the Reports. Those published in connection with the preceding descriptions of new species are omitted here:

HYMENOPTERA.

Nematus ventricosus; *larva:* IX, 21. (Previously described by several writers.)
Pristiphora grossulariæ; *larva:* IX, 26. (Description quoted from Walsh.)
Emphytus maculatus; *larva* and *pupa:* IX, 28–29. (Previously described by me in the *Prairie Farmer*, May 25, 1867.)
Lophyrus abbotii; *larva:* IX, 32.
Lophyrus lecontei; *larva:* IX, 33. (This and *abbotii* both partially described by me in the *Prairie Farmer*, November 10, 1866; May 25, 1867; May 2, 1868, and in the *Prairie Farmer Annual*, 1869.)
Tiphia inornata; *larva:* VI, 126.

COLEOPTERA.

Harpalus (probably herbivagus Say); *larva:* IX, 97.
Harpalid; *larva:* I, 59.
Mysia 15-punctata; *larva:* IV, 18.
Chilocorus bivulnerus; *larva* and *pupa:* I, 16.
Hippodamia convergens; *larva* and *pupa:* I, 112. (Previously mentioned in the *Am. Ent.* I, 46, and elsewhere.)
Coccinella picta; *larva:* V, 101.
Passalus cornutus; *larva* and *pupa:* IV, 140–141. (Previously mentioned by Burmeister and by Walsh.); *egg:* V, 55.
Lachnosterna quercina; *egg:* V, 55.
Pelidnota punctata; *larva* and *pupa:* III, 78–79. (First described by me in *Am. Ent.* II, 295.)
Telephorus bilineatus; *larva:* IV, 30. (First described by Packard.)
Chauliognathus pensylvanicus; *larva:* I, 57. (Quoted from the *Am. Ent.* I, 35.)
Chrysobothris femorata; *eggs:* VII, 73: *larva*, I, 46. (Previously described by Fitch and others); *eggs*, *larva*, and *pupa:* VII, 73.
Sinoxylon basilare; *larva* and *pupa:* IV, 54.
Corynetes rufipes; *larva* and *pupa:* VI, 101, 102.
Prionus laticollis; *larva:* I, 126; *larva* and *pupa:* II, 87; *egg:* V, 56. laticollis.)
Saperda bivittata; *pupa:* I, 43. (Previously described by Harris.)
Lema trilineata; *larva* and *pupa:* I, 99. (From the *Prairie Farmer*; and the *Am. Ent.* I, 26. Previously described by Harris and others.)
Doryphora juncta; *larva:* I, 106. (First described in the *Am. Ent.* I, 43.)
Doryphora 10-lineata; *eggs* and *larva:* I, 105. (From the *Am. Ent.* I, 43. Previously described by me in *Prairie Farmer* Aug. 8, 1863.

Colaspis flavida; *larva:* III, 84, and IV, 34.
Coscinoptera dominicana; *eggs* and *larva:* VI, 128, 130.
Haltica chalybea; *larva* and *pupa:* III, 81. (Quoted from *Am. Ent.* II, 327. The larva first described by Packard, *Guide*, p. 507.)
Blepharida rhois; *egg*, *larva* and *pupa:* VI, 121.
Cassida bivittata; *larva* and *pupa:* II, 61. (First described by me in the *Prairie Farmer Annual* for 1868, p. 53.)
Cassida aurichalcea; *egg:* II, 60; *larva* and *pupa*: II, 62. (Previously described by Harris.)
Cassida pallida; *larva:* II, 62.
Cassida guttata; *larva* and *pupa:* II, 63.
Cassida nigripes; *larva* and *pupa:* II, 63, 64.
Bruchus pisi; *egg:* III, 47.
Tenebrionid?; *larva:* VI, 118. (Previously described as the larva of Eupsalis by Harris.)
Eupsalis minuta; *larva* and *pupa:* VI, 115, 116. (The pupa first described by Harris.)
Conotrachelus cratægi; *larva* and *pupa:* III, 39.
Baridius trinotatus; *larva* and *pupa:* I, 95. (From the *Am. Ent.* I, 22.)
Anthonomus quadrigibbus; *egg*: III, 31; *larva* and *pupa:* III, 35.

LEPIDOPTERA.

Papilio philenor; *larva* and *pupa:* II, 117. (Previously described by Smith and Abbot, and by Boisduval and Le Conte; also by Harris in *Ent. Corr.*)
Pieris protodice; *larva* and *pupa:* II, 104. (Published simultaneously in the *Am. Ent.* II, 77.)
Pieris rapæ; *larva* and *pupa:* II, 108. (Previously described by various authors.)
Danais archippus; *egg:* III, 144.
Limenitis disippus; *egg* and *larva:* III, 154. (The mature larva previously described by various authors.)
Apatura lycaon; *egg*, *larva* and *pupa:* VI, 146, 147. (The larva and pupa badly described by Boisd. & Lec.)
Apatura herse; *egg*, *larva* and *pupa:* VI, 148. (The larva and pupa badly described by Boisd. & Lec.)
Paphia glycerium; *larva* and *pupa:* II, 127. (First published by me in *Am. Ent.* II, 123); *egg* and *larval changes:* V, 146.
Megathymus yuccæ; *egg*, *larva* and *larval changes:* VIII, 174, 181. (First published by me in Trans. St. Louis Ac.); IX, 129.
Chœrocampa pampinatrix; *egg*, *larva* and *pupa:* II, 71, 72. (Previously described, except egg, by various authors.)
Philampelus achemon; *young* and *full grown larvæ* and *pupa:* II, 74, 75. (Previously described by various authors.)
Philampelus satellitia; *eggs*, *young* and *full grown larvæ*, and *pupa:* II, 76–78. (Previously described, except egg, by various authors.)
Sphinx 5-maculata; *larva pupa:* 1, 95. (From the *Am. Ent.* I, 23; previously described by several authors.)
Thyreus Abbotii; *larva* and *pupa:* II, 78, 79. (Previously described by various authors.)
Deilephila lineata; two forms of *larva:* III, 141, 142. (Previously described, but not in connection. Quoted from the *Am. Ent.*, II, 258.)
Ægeria acerni; *larva* and *pupa:* VI, 110.
Ægeria rubi; *larva:* VI, 113.
Psychomorpha epimenis; *larva* and *pupa:* III, 64, 65; VI, 88. (First described as the possible larva and pupa of Eud. unio, *Am. Ent.* II, 152 and in 1st Rept., p. 84.)
Eudryas grata; *eggs*, *larva* and *pupa:* II, 83; VI, 89, 90. (The larva previously described by Harris and others.)

Eudryas unio; *larva* and *pupa:* VI, 92. (First described by Lintner.)
Alypia octomaculata; *larva:* I, 136, (previously mentioned by Fitch); II, 80, published simultaneously in the *Am. Ent.*, II, 151, (previously described in *Harris' Corr.*); VI, 94.
Procris americana; *larva* and *pupa:* II, 86. (First described by Harris.)
Callimorpha fulvicosta; *larva:* III, 134.
Spilosoma virginica; *larva* and *pupa:* III, 69. (Previously described by various authors.)
Hyphantria textor; *larva:* III, 132. (First described by Harris.)
Ecpantheria scribonia; *larva:* IV, 143. (Previously described by other authors.)
Bombyx mori; *egg* and *larva:* IV, 86. (Previously well known.)
Attacus cecropia; *larval changes:* IV, 106. (Quoted from the *Am. Ent.* II, 100.)
Attacus cynthia; *larval changes:* IV, 117. (Previously described by other authors.)
Attacus promethea; *larval changes:* IV, 121. (Partially given by other authors previously.)
Attacus luna; *larval changes:* IV, 124. (Previously given by Lintner.)
Attacus polyphemus; *larval changes:* IV, 126.
Attacus yama-maï; *larval changes:* IV, 132. (Previously described by other authors.)
Attacus pernyi; *egg*, *larva*, and *cocoon:* IV, 137. (Previously described by other authors)
Hemileuca maia; *egg* and *larval changes:* V, 128, 129. (Previously described by Lintner.)
Hyperchiria io; *larval changes:* V, 135. (Previously given by Lintner.)
Anisota rubicunda; *eggs* and *larval changes:* V, 138.
Acronycta oblinita; *larva* and *pupa:* III, 71. (The larva first figured by Smith & Abb.)
Acronycta xylinoides; *larva:* V, 126.
Amphipyra pyramidoides; *larva* and *pupa:* III, 73, 74.
Leucania unipuncta; *larva* and *pupa:* II, 49; VIII, 33, and *larva:* II, 55 (previously described by various authors); *egg:* VIII, 34; *egg* and *larval changes:* VIII, 184, 185.
Gortyna nitela; *larva:* I, 92. (From the *Am. Ent.*, II, 22. Briefly described by Harris, *Treatise*, p. 440; but first identified by me in the *Prairie Farmer.*)
Agrotis inermis; *larva* and *pupa:* I, 74.
Agrotis cochranii; *larva* and *pupa:* I, 76. (First described by me in the *Prairie Farmer*, June 22, 1867.)
Agrotis clandestina; *larva* and *pupa:* I, 79. (Previously mentioned by Harris.)
Agrotis telifera; *larva* and *pupa:* I, 81. (Described by me in the *Prairie Farmer*, June 22, 1867; and previously described in Europe, where the species also occurs and is known as *A. ypsilon.*)
Agrotis subgothica; *larva:* I, 82.
Agrotis jaculifera; *larva* and *pupa:* I, 83.
Agrotis devastator; *larva* and *pupa:* I, 84.
Hadena subjuncta; *larva* and *pupa:* I, 85.
Celæna renigera; *larva* and *pupa:* I, 86.
Prodenia commelinæ; *larva:* I, 88; III, 114 (from *Am. Ent.*, II, 363). [See Notes.]
Anisopteryx vernata; *larva* and *pupa:* II, 95–97 (previously described by other authors); *eggs*, *larva* and *pupa:* VII, 82 (and 86–87, adapted from Mann); Paleacrita vernata, VIII, 13–17 (from the Trans. St. Louis Acad.)
Anisopteryx pometaria; *eggs:* II, 94–95 (the two species confounded); *eggs*, *larva* and *pupa:* VII, 84 (and 86–87, adapted from Mann); VIII, 13–17 (from the Trans. St. Louis. Acad.)
Eufitchia ribearia; *egg*, *larva* and *pupa:* IX, 3. 4. (The larva first described by Fitch.)
Phacellura nitidalis; *larva:* II, 67.
Asopia costalis; *larva* and *pupa:* VI, 106. (The *larva* mentioned by Harris, but first described by Walsh in the *Prac. Ent.*, and first bred and determined by me, *Prairie Farmer*, April 20, 1867.)

Phycita nebulo; *larva* and *pupa:* IV, 41. (The larva first described by LeBaron.)
Pempelia grossulariæ; *larva* and *pupa:* I, 141. (Larva previously described by Fitch and by Packard.)
Tortrix rileyana; *larva* and *pupa:* I, 154.
Anchylopera fragariæ; *larva:* I, 143. (First described in the *Am. Ent.*, I, 90.)
Penthina vitivorana; *larva* and *pupa:* I, 135. (The larva first described, but not identified, by Rathvon.)
Carpocapsa pomonella; *larva* and *pupa:* I, 63. (Previously described by various authors.)
Walshia amorphella; *larva* and *pupa:* II, 133.
Bucculatrix pomifoliella; *larva* and *pupa:* IV, 51. (Larva previously described by Clemens.)
Œta compta; *larva* and *pupa:* I, 152.
Pterophorus periscelidactylus; *larva* and *pupa:* I, 137; III, 66. (Previously described by Fitch.)
Pterophorus carduidactylus; *larva* and *pupa:* I, 180.
Pronuba yuccasella; *larva:* V, 155; *pupa*, VI, 131 (from Trans. St. Louis Acad.); *egg*, VI, 133 (from *Am. Nat.*).
Orgyia leucostigma; *eggs*, *larva* and *pupa:* I, 144–146. (Previously described by others.)
Thyridopteryx ephemeræformis; *eggs*, *larva* and *pupa:* I, 148, 149. (Previously described by others.)
Hæmatopis grataria; *eggs*, *larva* and *pupa:* I, 179.
Galleria cereana; *larva* and *pupa:* I, 166. (Previously described by other authors.)

HEMIPTERA.

Strachia histrionica; *eggs*, *larva* and *pupa:* IV, 37.
Micropus leucopterus; *egg*, *larval stages* and *pupa:* VII, 21.
Cicada septemdecim; *egg* and *young larva:* I, 25. (The eggs previously described by several writers.)
Pœciloptera pruinosa; *eggs:* V, 122.
Ceresa bubalus; *eggs:* V, 121.
Mytilaspis pinifoliæ; *eggs* and *larva:* V, 98. (First mentioned by LeBaron.)
Phylloxera rileyi; *larva* and *pupa:* VI, 64, 86; VII, 120.
Phylloxera vastatrix; *various forms:* VI, 66 (previously described elsewhere and by others); *impregnated egg:* VIII, 159. (Previously described by me in the Trans. St. Louis Acad. for Oct. 18, 1875, and independently by Balbiani in the Comptes rendus de l' Ac. d. Sc. Paris for Oct. 4, 1875.)
Eriosoma pyri; *larva:* I, 120. (From the *Am. Ent.*, I, 82; previously described by several authors.)

DIPTERA.

Tabanus atratus; *larva* and *pupa:* II, 130, 131. (Previously described, but not specifically identified, by Walsh.)
Erax bastardi; *larva* and *pupa:* II, 124.
Bombyliid; *larva:* IX, 96.
Pipiza radicum; *larva* and *pupa:* I, 122. (Quoted from the *Am. Ent.*, I, 84.)
Anthomyia zeæ; *larva* and *puparium:* I, 155.
Meromyza americana; *larva* and *pupa:* I, 160.
Œstrus ovis; *larva* and *puparium:* I, 162. (Previously described by other authors.)

ORTHOPTERA.

Mantis carolina; *eggs* and *larva:* I, 170–171. (Previously described by several authors.)
Œcanthus niveus; *eggs:* V, 120. (Previously described as eggs of Ceresa bubulus by Fitch.)

Orchelimum glaberimum; *eggs:* V, 123.
Phaneroptera curvicauda; *eggs:* V, 124, and VI, 165; *larva* and *pupa:* VI, 166.
Microcentrus retinervis; *eggs:* V, 123; VI, 155 (previously described as eggs of Platyphyllum by Harris); *larva* and *pupa:* VI, 161.
Phylloptera oblongifolia; *eggs:* V, 123. (See Microcentrus.)
Platyphyllum concavum; *eggs:* V, 124; VI, 167.
Caloptenus spretus; *eggs* and *egg-mass:* IX, 88, 89; *larva* and *pupa:* VII, 129.

NEUROPTERA.

Corydalus cornutus; *larva* and *pupa:* V, 143, 144 (Previously described by Haldeman); *eggs* and *egg-mass*, and *young larva:* IX, 127.

LIST OF DESCRIPTIONS, MOSTLY AMPLIFIED, OF SPECIES NOT NEW.

The following list includes the species, already known, of which a complete redescription of the adult is given in the Reports, either because the original description was in a foreign language, or not easily accessible, or of one sex only, or for other reasons.

HYMENOPTERA.

Tiphia inornata *Say :* VI, 126.
Cryptus extrematis *Cress. :* IV, 111.
Pezomachus minimus *Walsh :* II, 52. (From Walsh.)
Ophion purgatus *Say :* II, 53.
Mesochorus vitreus *Walsh :* II, 52. (From Walsh.)
Pimpla annulipes *Brullé :* V, 49.
Macrocentrus delicatus *Cress. :* V, 50.
Microgaster militaris *Walsh :* II, 52. (From Walsh.)
Chalcis mariæ *Riley :* IV, 110. (From the *Am. Ent.*, II, 101–102.)
Isosoma vitis *Saunders :* II, 93. (From Saunders.)
Antigaster mirabilis *Walsh :* VI, 163. (From the *Am. Ent.*, II, 169–170.)
Pristiphora grossulariæ *Walsh :* IX, 26–27. (From the *Prac. Ent.*, I, 123.)
Nematus ventricosus (*Klug*): IX, 22. (From the *Prac. Ent.*, I, 120–121, and the *Am. Ent.*, II, 16–17.)
Emphytus maculatus *Nort. :* IX, 28.
Lophyrus LeContei *Fitch :* IX, 33.

COLEOPTERA.

Doryphora 10-lineata *Say*, var. : IX, 40.
Sphenophorus zeæ *Walsh :* III, 59. (From Walsh.)
Scolytus caryæ *Riley :* V, 107. (Female first described in *Prairie Farmer* Feb. 2, 1867.) [See Notes.]

LEPIDOPTERA.

Apatura lycaon (*Fabr.*): VI, 144.
Apatura herse (*Fabr.*): VI, 144.
Megathymus yuccæ (*Walk.*): VIII, 175–176.
Ægeria polistiformis *Harr. :* III, 76.
Ægeria acerni *Clem. :* VI, 110.
Prodenia autumnalis *Riley :* III, 116–117. (From *Am. Ent.*, II, 365.) [See Notes.]
Leucania unipuncta *Haw. :* II, 56.
Leucania albilinea *Guen. :* IX, 56–57.
Acronycta oblinita *Sm. & Abb. :* III, 71.
Amphipyra pyramidoides *Guen. :* III, 74.
Celæna renigera *Steph. :* I, 86.
Hadena subjuncta *Gr. & Rob. :* I, 85.
Noctua clandestina *Harr. :* I, 79.

Agrotis inermis *Harr.:* I, 74.
Agrotis cochranii *Riley:* I, 75.
Agrotis telifera *Harr.:* I, 81.
Agrotis jaculifera *Guen.:* I, 83.
Anisopteryx pometaria *Harr.:* VIII, 15–17. (From the Trans. St. Louis Acad. Sc.)
Paleacrita vernata (Peck): VIII, 15–17. (From the Trans. St. Louis Acad. Sc.)
Asopia costalis (*Fab.*): VI, 107.
Pempelia grossulariæ (*Pack.*): I, 141.
Walshia amorphella *Clem.:* II, 133.
Penthina vitivorana *Pack.:* I, 135.
Euryptychia sa igneana *Clem.:* II, 134. (From Clemens.)
Tortrix rileyana *Grote:* I, 154.
Walshia amorphella *Clem.:* II, 133.
Holcocera glandulella *Riley:* IV, 145. (From the *Can. Ent.*, IV, 18–19.)
Pronuba yuccasella *Riley:* V, 150, 151, 155; VI, 131–132. (Both from the Trans. St. Louis Acad. Sc.)
Œta compta *Clem.:* I, 153.

HEMIPTERA.

Micropus leucopterus (*Say*): VII, 21, 22.
Mytilaspis pinifoliæ (*Fitch*): V, 99.
Eriosoma pyri (*Fitch*): I, 120.
Phylloxera vastatrix *Planchon:* VIII, 159 (From Trans. St. Louis Acad. Sc.); VI, 66–67; VII, 93, 99.
Phylloxera Rileyi *Licht.:* IV, 66; VI, 64, 86; VII, 118–120.
Phylloxera caryæ-gummosa *Riley:* VII, 118. (From the *Comptes Rendus*, Paris Acad. of Sci., Dec. 14, 1874.)
Phylloxera caryæ-ren *Riley:* VII, 118. (From the *Comptes Rendus*, Paris Acad. of Sci., Dec. 14, 1874.)
Phylloxera caryæ-fallax *Riley:* VII, 118. (From the *Comptes Rendus*, Paris Acad. of Sci., Dec. 14, 1874.)

DIPTERA.

Erax bastardi *Macq:* II, 124.
Pipiza radicum *Walsh & Riley:* I, 121–122. (From the *Am. Ent.* I, 83–84.)
Exorista leucaniæ *Walsh:* II, 51. (From Walsh.)
Tachina bifasciata (*Fabr.*): V, 140.

ORTHOPTERA.

Caloptenus femur-rubrum (*DeG.*): VII, 126–128.
Caloptenus atlanis *Riley:* VIII, 117.
Caloptenus spretus (*Thos.*): VII, 128–132; VIII, 117.

ACARINA.

Hoplophora arctata *Riley:* VI, 81. (From Trans. St. Louis Acad., III, 216.)
Tyroglyphus phylloxeræ *Riley & Planchon:* VI, 81. (From Trans. St. Louis Acad., III, 215.)

LIST OF ILLUSTRATIONS.

The illustrations in the Reports were prepared at the author's expense, neither the State nor the Board of Agriculture making any provision therefor. The wood-engraving was done for the most part in St. Louis, by either Wm. Macwitz, Emile Lampe, or Wittemberg & Sorber. Some of it was done by Van Ingen & Snyder, of Philadelphia. A few of the later illustrations are by photo-engraving, and Figs. 50–52 of the 8th Report show the first attempt to combine this process with lithography. In the following list, all drawings were made from nature by the author unless otherwise stated, and when the figure is enlarged the natural size, unless otherwise apparent or stated in this list, will be found indicated in hair-line. The nomenclature of the Reports is retained.

REPORT I.

PLATE I. (Drawn by D. Wiest and lithographed by Bowen & Co., Philadelphia.)

FIG. 1. Unarmed Rustic (*Agrotis inermis* Harr.), moth.
FIG. 2. Variegated Cut-worm (*Agrotis inermis* Harr.).
FIG. 3. Variegated Cut-worm (*Agrotis inermis* Harr.), head, enlarged.
FIG. 4. Variegated Cut-worm (*Agrotis inermis* Harr.), one joint, enlarged.
FIG. 5. Climbing Cut-worm Moth (*Agrotis scandens* Riley), wings spread.
FIG. 6. Climbing Cut-worm Moth (*Agrotis scandens* Riley), wings closed.
FIG. 7. Climbing Cut-worm (*Agrotis scandens* Riley).
FIG. 8. Lance Rustic (*Agrotis telifera* Harr.), moth.
FIG. 9. Greasy Cut-worm (*Agrotis telifera* Harr.).
FIG. 10. Greasy Cut-worm (*Agrotis telifera* Harr.), head, enlarged.
FIG. 11. Dart-bearing Rustic (*Agrotis jaculifera* Guen.), moth.
FIG. 12. *Prodenia commelinæ*, Sm. & Abb., one joint of larva enlarged.
FIG. 13. Clandestine Owlet Moth (*Noctua clandestina* Harr.).
FIG. 14. Subjoined Hadena (*Hadena subjuncta* Gr. & Rob.), moth.
FIG. 15. Speckled Cut-worm (*Hadena subjuncta* Gr. & Rob.), head, enlarged.
FIG. 16. Speckled Cut-worm (*Hadena subjuncta* Gr. & Rob.), one joint, enlarged.
FIG. 17. Speckled Cut-worm (*Hadena subjuncta* Gr. & Rob.), anal joint, enlarged.
FIG. 18. Eight-spotted Forester (*Alypia octomaculata*, Fabr.).
FIG. 19. Grape-vine Epimenis (*Psychomorpha epimenis*, Drury), larva. (Mentioned on p. 136, but first named in the 3d Rept., p. 63.)

PLATE II. (Drawn by D. Wiest and lithographed by Bowen & Co., Philadelphia.)

FIG. 1. Solidago Gall Moth (*Gelechia gallæsolidaginis* Riley), wings expanded.
FIG. 2. Solidago Gall Moth (*Gelechia gallæsolidaginis* Riley), wings closed.
FIG. 3. Walnut Tortrix (*Tortrix rileyana* Grote), wings expanded.
FIG. 4. Walnut Tortrix (*Tortrix rileyana* Grote), wings closed.
FIG. 5. Solidago Gall Moth (*Gelechia gallæsolidaginis* Riley), larva swollen by the cocoons of the Inflating Chalcis-fly within.
FIG. 6. Inflating Chalcis-fly, enlarged.
FIG. 7. *Hemiteles* (?) *cressonii* Riley, enlarged.
FIG. 8. *Eurytoma bolteri* Riley; male antenna, enlarged.

FIG. 9. *Eurytoma bolteri* Riley; female, enlarged.
FIG. 10. Bag of Bag-worm (*Thyridopteryx ephemeræformis* Steph.), cut to show the cocoons of *Hemiteles* (?) *thyridopterygis*.
FIG. 11. *Hemiteles* (?) *thyridopterygis* Riley, female.
FIG. 12. *Hemiteles* (?) *thyridopterygis* Riley, male.
FIG. 13. Thistle Plume (*Pterophorus carduidactylus* Riley), moth.
FIG. 14. Thistle Plume (*Pterophorus carduidactylus* Riley), chrysalis.
FIG. 15. Grape-vine Plume (*Pterophorus periscelidactylus* Fitch), moth.
FIG. 16. Grape-vine Plume (*Pterophorus periscelidactylus* Fitch), chrysalis.
FIG. 17. Gooseberry Fruit-worm Moth (*Pempelia grossulariæ* Pack.).
FIG. 18. Chickweed Geometer (*Hæmatopis grataria*, Fabr.), moth.
FIG. 19. Chickweed Geometer (*Hæmatopis grataria*, Fabr.), larva.
FIG. 20. Chickweed Geometer (*Hæmatopis grataria*, Fabr.), pupa.
FIG. 21. Chickweed Geometer (*Hæmatopis grataria*, Fabr.), eggs.
FIG. 22. Ailanthus worm (*Œta compta*, Clem.), moth, with spread wings.
FIG. 23. Ailanthus worm (*Œta compta*, Clem.), moth, with closed wings.
FIG. 24. Seed-corn Maggot (*Anthomyia zeæ* Riley), fly, enlarged.
FIG. 25. Raspberry Geometer (*Aplodes rubivora* Riley), moth.
FIG. 26. Strawberry Leaf-roller (*Anchylopera fragariæ* Walsh & Riley), moth, enlarged.
FIG. 27. Strawberry Leaf-roller (*Anchylopera fragariæ* Walsh & Riley), moth, natural size.
FIG. 28. American Meromyza (*Meromyza americana* Fitch), fly, enlarged.
FIG. 29. Grape-berry Moth (*Penthina vitivorana* Pack.), moth, enlarged.
FIG. 30. Grape-berry Moth (*Penthina vitivorana* Pack.), moth, natural size.

WOOD-CUTS.

FIG. 1. Harris's Bark-louse (*Aspidiotus Harrisii* Walsh).
FIG. 2. Oyster-shell Bark-louse (*Aspidiotus conchiformis*, Gmélin).
FIG. 3. Oyster-shell Bark-louse (*Aspidiotus conchiformis*, Gmélin). 1, egg (natural size scarcely .01.) 2, larva, as it appears when running over the twigs (natural size .01.) 3, its appearance after becoming fixed. 4, appearance of scale after the second plate is formed. 5, form of louse (ventral view) soon after losing its members. 6, form of louse (ventral view) when full grown and just about to deposit. 7, fully formed scale, containing louse, as it appears from the under side when raised. 8, highly magnified antenna of larva, showing joints.
FIG. 4. Twice-stabbed Ladybird (*Chilocorus bivulnerus* Muls.). [From the *Practical Entomologist.*]
FIG. 5. Twice-stabbed Ladybird (*Chilocorus bivulnerus* Muls.), larva.
FIG. 6. Seventeen-year Cicada (*Cicada septemdecim* Linn.). A, ♂ of typical form; *c*, *d*, genital hooks; *g*, singing apparatus. B, ♂ of the small form (*cassinii*); *e*, *f*, genital hooks.
FIG. 7. Seventeen-year Cicada (*Cicada septemdecim*, Linn.). *a*, pupa; *b*, cast pupa shell; *c*, imago; *d*, punctured twig: *e*, two eggs.
FIG. 8. Seventeen-year Cicada (*Cicada septemdecim* Linn.), galleries made by pupa; *a*, front view, *c*, orifice; *b*, section, *c*, pupa awaiting time of change, *d*, pupa ready to transform.
FIG. 9. Twig punctured by the Seventeen-year Cicada (*Cicada septemdecim* Linn.).
FIG. 10. Twig healed after the puncture of the Seventeen-year Cicada (*Cicada septemdecim* Linn.).
FIG. 11. Thirteen-year Cicada (*Cicada tredecim* Linn.), newly hatched larva.
FIG. 12. *Stizus grandis* Say, ♀.
FIG. 13. Seventeen-year Cicada (*Cicada septemdecim* Linn.), side view of ♀ to show beak, *a*, and ovipositor, *b*.

FIG. 14. Round-headed Apple-tree Borer (*Saperda bivittata* Say). *a*, larva; *b*, pupa; *c*, imago.

FIG. 15. Flat-headed Apple-tree Borer (*Chrysobothris femorata*, Fabr.), larva.

FIG. 16. Flat-headed Apple-tree Borer (*Chrysobothris femorata*, Fabr.), imago.

FIG. 17. Peach-tree Borer (*Ægeria exitiosa* Say); 1, ♀; 2, ♂.

FIG. 18. Plum Curculio (*Conotrachelus nenuphar*, Herbst); *a*, larva; *b*, pupa; *c*, imago; *d*, plum and curculio, natural size, the plum bearing one of the punctures.

FIG. 19. Pennsylvania Soldier-beetle (*Chauliognathus pensylvanicus*, DeGeer). *a*, larva, natural size; *b*, head and first segment enlarged; *c*, under lip (*labium*); *d*, upper lip (*labrum*); *e*, leg; *f*, left lower jaw (*maxilla*); *g*, antenna; *h*, left upper jaw (*mandible*).

FIG. 20. Lacewing (*Chrysopa* sp.); *a*, eggs; *b*, larva; *c*, cocoon, the upper figure showing the lid; *d*, imago. [*a*, *b*, *d* after Westwood.]

FIG. 21. Subangular Ground-beetle (*Aspidoglossa subangulata* Chaud.).

FIG. 22. Carabid larva. A, natural size; B, under side of head, enlarged; *c*, mandible; *e*, antenna; *f*, labium and labial palpi; *g*, maxilla and its palpi; *h*, joint 12 beneath; *i*, joint 11 beneath; *j*, joints 4–10 each beneath—enlarged.

FIG. 23. Pennsylvania Ground-beetle (*Harpalus pensylvanicus*, DeGeer).

FIG. 24. Codling-moth (*Carpocapsa pomonella*, Linn.) *a*, apple showing the work of the larva; *b*, point of entrance of the larva; *d*, pupa; *e*, larva; *f*, *g*, moth; *h*, head of larva; *i*, cocoon.

FIG. 25. Pupa of Cut-worm in earthen cell. [After Curtis.]

FIG. 26. Dark-sided Cut-worm (*Agrotis Cochranii* Riley). *a*, larva; *b*, moth.

FIG. 27. W-marked Cut-worm (*Noctua clandestina* Harr.).

FIG. 28. Lance Rustic (*Agrotis telifera* Harr.), moth.

FIG. 29. Gothic Dart (*Agrotis subgothica*, Haw.), moth.

FIG. 30. Glassy Cut-worm (*Agrotis devastator*, Brace). Lower figure represents the side of one of the middle segments.

FIG. 31. Figure 8 Minor (*Celæna renigera* Steph.). *a*, moth; *b*, larva.

FIG. 32. *Microgaster militaris* Walsh. [After Walsh.]

FIG. 33. Spined Soldier-bug (*Arma spinosa* Dallas). *a*, beak magnified; *b*, bug with right wing spread.

FIG. 34. Fiery Ground-beetle (*Calosoma calidum*, Fabr.); *a*, larva; *b*, beetle.

FIG. 35. Potato-stalk Borer (*Gortyna nitela* Guen.) 1, moth; 2, larva.

FIG. 36. Potato-stalk Borer (*Gortyna nitela* Guen.) larva.

FIG. 37. Potato-stalk Weevil (*Baridius trinotatus*, Say); *a*, larva; *b*, pupa; *c*, beetle, (all enlarged).

FIG. 38. Potato- or Tomato-worm (*Sphinx* 5-*maculata* Haw.). A, larva; B, pupa; C, moth. [After Harris.]

FIG. 39. Striped Blister-beetle (*Lytta vittata* Fabr.). [From *Practical Entomologist.*]

FIG. 40. *a*, Ash-gray Blister-beetle (*Lytta cinerea* Fabr.), *d*, antennæ; *b*, Black-rat Blister-beetle (*Lytta murina* Lec.), c, antennæ.

FIG. 41. Margined Blister-beetle (*Lytta marginata* Fabr.). [From *Practical Entomologist.*)

FIG. 42. Three-lined Potato-beetle (*Lema trilineata*, Oliv.); *a*, larva; *b*, tip of its body; *c*, pupa; *d*, eggs. [From *Practical Entomologist.*]

FIG. 43. Three-lined Potato-beetle (*Lema trilineata*, Oliv.). [From *Practical Entomologist.*]

FIG. 44. Striped Cucumber-beetle (*Diabrotica vittata*, Fabr.). [From *Practical Entomologist.*]

FIG. 45. Cucumber Flea-beetle (*Haltica cucumeris* Harr.). [From *Practical Entomologist.*]

FIG. 46. Colorado Potato-beetle (*Doryphora* 10-*lineata*, Say); *a*, eggs; *b*, larva, in different stages; *c*, pupa; *d*, imago or beetle; *e*, wing-cover, enlarged; *f*, leg, enlarged.

FIG. 47. Bogus Colorado Potato-beetle (*Doryphora juncta*, Germar); *a*, eggs; *b*, larva; *c*, beetle; *d*, wing-cover, enlarged; *e*, leg, enlarged.
FIG. 48. Colorado Potato-beetle Parasite (*Lydella doryphoræ* Riley).
FIG. 49. Spotted Ladybird (*Hippodamia maculata*, DeGeer). [From *Practical Entomologist.*]
FIG. 50. Nine-spotted Ladybird (*Coccinella* 9-*notata* Herbst). [From *Practical Entomologist.*]
FIG. 51. Thirteen-spotted Ladybird (*Hippodamia* 13-*punctata*, Linn.).
FIG. 52. Convergent Ladybird (*Hippodamia convergens* Guer.)
FIG. 53. Ladybird larva. [After Westwood.]
FIG. 54. Spined Soldier-bug (*Arma spinosa* Dallas); *a*, beak enlarged; *b*, bug; *c*, enlarged beak of an allied plant-feeder (*Euschistus punctipes*, Say).
FIG. 55. Common Squash-bug (*Coreus tristis*, DeGeer); *b*, enlarged beak.
FIG. 56. Bordered Soldier-bug (*Stiretrus fimbriatus*, Say).
FIG. 57. Many-banded Robber (*Harpactor cinctus*, Fabr.); *b*, enlarged beak.
FIG. 58. Rapacious Soldier-bug (*Reduvius raptatorius* Say).
FIG. 59. Virginian Tiger-beetle (*Tetracha virginica* Hope).
FIG. 60. Fiery Ground-beetle (*Calosoma calidum*, Fabr.).
FIG. 61. Elongate Ground-beetle (*Pasimachus elongatus* Lec.).
FIG. 62. Murky Ground-beetle (*Harpalus caliginosus* Say).
FIG. 63. Pincers for crushing Potato-beetles.
FIG. 64. Apple-root Plant-louse (*Eriosoma pyri*, Fitch); *a*, affected root; *b*, larva; *c*, winged louse; *d*, leg; *e*, proboscis; *f*, antenna of winged louse; *g*, antenna of larva (all greatly enlarged).
FIG. 65. Vagabond Plant-louse (*Pemphigus vagabundus*, Walsh).
FIG. 66. Root-louse Syrphus-fly (*Pipiza radicum* Riley); *a*, larva; *b*, puparium from which the fly has emerged; *c*, fly.
FIG. 67. Gigantic Grape-root Borer (*Prionus laticollis*, Drury).
FIG. 68. Gigantic Grape-root Borer (*Prionus laticollis*, Drury); head and thoracic joints.
FIG. 69. Cylindrical Orthosoma (*Orthosoma cylindricum*, Fabr.).
FIG. 70. Grape Curculio (*Cœliodes inæqualis*, Say); *a*, infested grape; *b*, larva.
FIG. 71. Grape Curculio (*Cœliodes inæqualis*, Say). [After Walsh.]
FIG. 72. Grape Curculio (*Cœliodes inæqualis*, Say); front leg. [After Walsh.]
FIG. 73. Grape-seed Maggot (*Isosoma vitis* Saunders).
FIG. 74. Grape-cane Gall-curculio (*Baridius Sesostris* Lec.).
FIG. 75. Grape-vine Fidia (*Fidia viticida* Walsh). [From *Practical Entomologist.*]
FIG. 76. Grape Fruit-worm (*Penthina vitivorana* Pack. = *Lobesia botrana* Schiff.); *a*, pupa; *b*, cocoon.
FIG. 77. Snowy Tree-cricket (*Œcanthus niveus* Harr.), ♂. [From *Practical Entomologist.*]
FIG. 78. Snowy Tree-cricket (*Œcanthus niveus* Harr.), ♀. [From *Practical Entomologist.*]
FIG. 79. Gooseberry Fruit-worm (*Pempelia grossulariæ* Pack.); *a*, cocoon; *b*, moth. [After Packard.]
FIG. 80. Strawberry Leaf-roller (*Anchylopera fragariæ* Walsh & Riley; *a*, larva; *b*, anterior part enlarged; *d*, anal segment; *c*, moth.
FIG. 81. White-marked Tussock Moth (*Orgyia leucostigma*, Sm. & Abb.); *a*, ♀ on cocoon; *b*, larva; *c*, female pupa; *d*, male pupa.
FIG. 82. White-marked Tussock Moth (*Orgyia leucostigma*, Sm. & Abb.); female caterpillar.
FIG. 83. White-marked Tussock Moth (*Orgyia leucostigma*, Sm. & Abb.), male.
FIG. 84. Bag-worm (*Thyridopteryx ephemeræformis* Haw.); *a*, larva; *b*, male chrysalis; *c*, female moth; *d*, male moth; *e*, female chrysalis in bag, sectional view; *f*, caterpillar and bag; *g*, very young caterpillars in their bags.
FIG. 85. Walnut Tortrix (*Tortrix Rileyana* Grote); *a*, larva; *b*, side view of one segment.

FIG. 86. Seed-corn Maggot (*Anthomyia zeæ* Riley); *a*, enlarged; *b*, puparium.
FIG. 87. Seed-corn Maggot (*Anthomyia zeæ* Riley); kernels of corn containing the maggot.
FIG. 88. White Grub or May-beetle (*Lachnosterna quercina*, Knoch); 1, pupa; 2, the grub; 3, 4, the beetle.
FIG. 89. White Grub attacked by fungus.
FIG. 90. American Meromyza (*Meromyza americana* Fitch); *a*, infested stalk; *b*, maggot; *c*, pupa.
FIG. 91. Sheep Head Maggot (*Œstrus ovis* Linn.); 1 and 2, the Gad-fly; 3, the puparium; 4, larva, dorsal view; 5, larva, ventral view; 6, younger larva; *a*, head; *b*, corneous appendages at anus; *c*, spiracles.
FIG. 92. Bee-moth (*Galleria cereana* Fabr.); *a*, larva; *b*, cocoon; *c*, pupa; *d*, *e*, moth.
FIG. 93. Nebraska Bee-killer (*Trupanea apivora* Fitch = *Promachus Fitchii* O. S.).
FIG. 94. Camel-cricket (*Mantis carolina*, Linn.); *a*, female; *b*, male.
FIG. 95. Camel-cricket (*Mantis carolina*, Linn.), egg-masses.
FIG. 96. Solidago Gall of *Gelechia gallæsolidaginis* Riley; *a*, section of gall; *b*, whole gall; *c*, orifice through which the moth escapes; *d*, excrement of the larva; *e*, larva.
FIG. 97. *Eurytoma Bolteri* Riley; antennæ of ♂ and ♀.
FIG. 98. Thistle Plume-moth (*Pterophorus carduidactylus* Riley = *Pt. cardui* Zell. emend), anterior and posterior joints of the larva.

REPORT II.

FIG. 1. Chinch-bug (*Micropus leucopterus*, Say).
FIG. 2. Chinch-bug (*Micropus leucopterus*, Say), short-winged form.
FIG. 3. Spotted Ladybird (*Hippodamia maculata*, DeGeer). [From *Practical Entomologist.*]
FIG. 4. Trim Ladybird (*Coccinella munda* Say).
FIG. 5. Lacewing (*Chrysopa* sp.). [After Westwood.]
FIG. 6. Insidious Flower-bug (*Anthocoris insidiosus*, Say).
FIG. 7. Spined Soldier-bug (*Arma spinosa* Dallas).
FIG. 8. Ash-gray Leaf-bug (*Piesma cinerea*, Say).
FIG. 9. Flea-like Negro-bug (*Corimelæna pulicaria*, Germar).
FIG. 10. Bordered Soldier-bug (*Stiretrus fimbriatus*, Say).
FIG. 11. Tent-caterpillar of the Forest (*Clisiocampa sylvatica* Harr.).
FIG. 12. Cotton-worm (*Anomis xylina*, Say); *a*, egg; *b*, worm, one-third grown; *d*, top view; *c*, side view of full-grown worm; *e*, cocoon; *f*, chrysalis. [Adapted from Glover.]
FIG. 13. Cotton-worm Moth (*Anomis xylina*, Say); *a*, with wings expanded; *b*, wings closed.
FIG. 14. Army-worm (*Leucania unipuncta* Haw.).
FIG. 15. Army-worm (*Leucania unipuncta* Haw.), chrysalis.
FIG. 16. Army-worm Moth (*Leucania unipuncta* Haw.).
FIG. 17. Red-tailed Tachina-fly (*Exorista leucaniæ* Kirk.).
FIG. 18. Yellow-tailed Tachina-fly (*Exorista flavicauda* Riley).
FIG. 19. Glassy Mesochorus (*Mesochorus vitreus* Walsh). [After Walsh.]
FIG. 20. *Pezomachus minimus* Walsh. [After Walsh.]
FIG. 21. *Pezomachus minimus* Walsh; bunch of cocoons. [After Walsh.]
FIG. 22. *Chalcis albifrons* Walsh. [After Walsh.]
FIG. 23. *Microgaster militaris* Walsh. [After Walsh.]
FIG. 24. *Glyphe viridascens* Walsh. [After Walsh.]
FIG. 25. *Ophion purgatus* Say.
FIG. 26. Clubbed Tortoise-beetle (*Deloyala clavata*, Oliv.).
FIG. 27. Two-striped Sweet-potato Beetle (*Cassida bivittata* Say); 2, larva; 3, pupa; 4, beetle.

FIG. 28. *Chelymorpha cribraria*, Fabr.; pupa (enlarged). [After Packard.]
FIG. 29. *Chelymorpha cribraria*, Fabr. (enlarged). [After Packard.]
FIG. 30. *Physonota quinquepunctata* Walsh & Riley; *a*, larva; *b*, beetle.
FIG. 31. Golden Tortoise-beetle (*Cassida aurichalcea*, Fabr.), egg.
FIG. 32. Two-striped Sweet-potato Beetle (*Cassida bivittata* Say), larvæ.
FIG. 33. Golden Tortoise-beetle (*Cassida aurichalcea*, Fabr.), larva; *a*, natural size; *b*, enlarged and with the dung taken from the fork.
FIG. 34. Golden Tortoise-beetle (*Cassida aurichalcea*, Fabr.); *a*, pupa; *b*, beetle.
FIG. 35. Mottled Tortoise-beetle (*Cassida guttata*, Oliv.); *a*, larva; *b*, pupa.
FIG. 36. Mottled Tortoise-beetle (*Cassida guttata*, Oliv.).
FIG. 37. Black-legged Tortoise-beetle (*Cassida nigripes* Oliv.); *a*, larva; *b*, larva cleaned and enlarged; *c*, pupa (enlarged).
FIG. 38. Black-legged Tortoise-beetle (*Cassida nigripes* Oliv.).
FIG. 39. Striped Cucumber-beetle (*Diabrotica vittata*, Fabr.). [From *Practical Entomologist.*]
FIG. 40. Striped Cucumber-beetle (*Diabrotica vittata*, Fabr.), larva; *a*, dorsal view; *b*, side view.
FIG. 41. Striped Cucumber-beetle (*Diabrotica vittata*, Fabr.) pupa; 1, ventral; 2, dorsal view.
FIG. 42. Twelve-spotted Diabrotica (*Diabrotica* 12-*punctata*, Oliv.). [From *Practical Entomologist.*]
FIG. 43. Pickle-worm (*Phacellura nitidalis* Cram.); *a*, natural size; *b*, head and first joints, enlarged; *c*, side view of a joint, enlarged; *d*, cervical shield, enlarged; *e*, side of first joint, enlarged; *f*, 2d joint from above, enlarged; *g*, anal joint, enlarged; *h*, cocoon; *i*, moth, male.
FIG. 44. Hog-caterpillar of the Vine (*Chærocampa pampinatrix*, Sm. & Abb.).
FIG. 45. Hog-caterpillar of the Vine (*Chærocampa pampinatrix*, Sm. & Abb.), chrysalis.
FIG. 46. Hog-caterpillar of the Vine (*Chærocampa pampinatrix*, Sm. & Abb.), moth.
FIG. 47. Microgaster cocoons or Hog-caterpillar of the Vine (*Chær. pampinatrix*, Sm. & Abb.) [After Harris.]
FIG. 48. *Microgaster* = *Apanteles*. [After Harris.]
FIG. 49. Achemon Sphinx (*Philampelus achemon*, Drury), caterpillar.
FIG. 50. Achemon Sphinx (*Philampelus achemon*, Drury), chrysalis.
FIG. 51. Achemon Sphinx (*Philampelus achemon*, Drury), moth.
FIG. 52. Satellite Sphinx (*Philampelus satellitia*, Linn.); *a*, full-grown larva; *b*, its position at rest; *c*, young larva.
FIG. 53. Satellite Sphinx (*Philampelus satellitia*, Linn.), moth.
FIG. 54. Abbot Sphinx (*Thyreus Abbotii* Swainson); larva and moth.
FIG. 55. Eight-spotted Forrester (*Alypia octomaculata*, Fabr.); *a*, caterpillar; *b*, side view of one joint; *c*, moth.
FIG. 56. Beautiful Wood-nymph (*Eudryas grata*, Fabr.).
FIG. 57. ? Pearl Wood-nymph (*Eudryas unio*, Hüb.); *a*, larva; *b*, side view of one segment enlarged; *c*, hump on 11th joint, enlarged. (See 3d Rep., Fig. 25.)
FIG. 58. American Procris (*Procris americana* Boisd.); *a*, larva; *b*, chrysalis; *c*, cocoon; *d*, *e*, moth.
FIG. 59. American Procris (*Procris americana* Boisd.), larvæ.
FIG. 60. Gigantic Grape-root Borer (*Prionus laticollis*, Drury).
FIG. 61. Broad-necked Prionus (*Prionus laticollis*, Drury), female.
FIG. 62. Gigantic Grape-root Borer (*Prionus laticollis*, Drury), pupa.
FIG. 63. Tile-horned Prionus (*Prionus imbricornis*, Linn.), male.
FIG. 64. Grape-seed Maggot (*Isosoma vitis* Saunders).
FIG. 65. Joint-worm Fly (*Isosoma hordei*, Harr.); *a*, female; *b*, male; *c*, ♀ antenna; *d*, ♂ antenna; *e*, ♀ abdomen; *f*, ♂ abdomen.

FIG. 66. Canker-worm; *a*, eggs of Fall Canker-worm (*Anisopteryx pometaria* Harr.); *b*, five eggs of same, enlarged; *c*, larva of Spring Canker-worm (*Paleacrita vernata*, Peck), *d*, cocoon, *e*, crysalis, *f*, male moth, *g*, female moth—all probably of *vernata*. (See 6th Rept., p. 29). [*a*, *b*, *c*, *d*, *e*, after Harris; *f*, *g*, after Packard.]
FIG. 67. Spring Canker-worm (*Paleacrita vernata*, Peck), head enlarged.
FIG. 68. Mite (*Nothrus ovivorus* Pack.), enlarged. [After Packard.]
FIG. 69. Rummaging Ground-beetle (*Calosoma scrutator*, Fabr.).
FIG. 70. Fiery Ground-beetle (*Calosoma calidum*, Fabr.).
FIG. 71. Fraternal Potter-wasp (*Eumenes fraterna* Say); *b*, clay nest; *c*, same cut open.
FIG. 72. Southern Cabbage-butterfly (*Pieris protodice* Boisd.); *a*, caterpillar; *b*, chrysalis.
FIG. 73. Southern Cabbage-butterfly (*Pieris protodice* Boisd.), female.
FIG. 74. Southern Cabbage-butterfly (*Pieris protodice* Boisd.), male.
FIG. 75. Potherb Butterfly (*Pieris oleracea* Boisd.). [After Harris.]
FIG. 76. Potherb Butterfly (*Pieris oleracea* Boisd.), chrysalis. [After Harris.]
FIG. 77. Imported Cabbage-butterfly (*Pieris rapæ* Schrank.); *a*, larva; *b*, chrysalis. [After Curtis.]
FIG. 78. Imported Cabbage-butterfly (*Pieris rapæ* Schrank.), female.
FIG. 79. Imported Cabbage-butterfly (*Pieris rapæ* Schrank.), male.
FIG. 80. Butterfly Net: 5, socket; 6, ring.
FIG. 81. Cabbage Plusia (*Plusia brassicæ* Riley); *a*, caterpillar; *b*, chrysalis in cocoon; *c*, moth, male.
FIG. 82. Zebra-caterpillar (*Mamestra picta* Harr.); *a*, caterpillar; *b*, moth.
FIG. 83. Tarnished Plant-bug (*Capsus oblineatus* Say).
FIG. 84. Philenor Swallow-tail (*Papilio philenor* Drury), caterpillar.
FIG. Philenor Swallow-tail (*Papilio philenor* Drury); *a*, chrysalis, back view; *b*, lateral outline.
FIG. 86. Philenor Swallow-tail (*Papilio philenor* Drury).
FIG. 87. Cottonwood Dagger (*Acronycta populi* Riley); caterpillar.
FIG. 88. Cottonwood Dagger (*Acronycta populi* Riley).
FIG. 89. Missouri Bee-killer (*Asilus missouriensis* Riley).
FIG. 90. Wing of *Promachus* (*a*), *Asilus* (*b*), *Erax* (*c*).
FIG. 91. Silky Asilus (*Asilus sericeus* Say). [After Harris.]
FIG. 92. *Erax bastardi* Macq., larva.
FIG. 93. *Erax bastardi* Macq.; *a*, fly; *b*, pupa.
FIG. 94. Goat-weed Butterfly (*Paphia glycerium* Doubl.); *a*, caterpillar; *b*, chrysalis.
FIG. 95. Goat-weed Butterfly (*Paphia glycerium* Doubl.), male.
FIG. 96. Goat-weed Butterfly (*Paphia glycerium* Doubl.), female.
FIG. 97. Black Breeze-fly (*Tabanus atratus* Fabr.); *a*, larva; *b*, pupa shell; *c*, fly.
FIG. 98. False-indigo Gall-moth (*Walshia amorphella* Clem.); *a*, moth; *b*, caterpillar; *c*, gall; *d*, section of gall, showing larva in burrow.
FIG. 99. Misnamed Gall-moth (*Euryptychia saligneana* Clem.); *a*, moth; *b*, gall with protruding pupa-shell.

REPORT III.

FIG. 1. Plum Curculio (*Conotrachelus nenuphar*, Herbst); *a*, larva; *b*, pupa; *c*, curculio, enlarged; *d*, punctured plum with curculio resting on it, natural size.
FIG. 2. The Hull Curculio-catcher.
FIG. 3. The Hull Curculio-catcher; viewed from beneath; *a*, slide for closing central hole, *d*; *b b*, handles; *c c*, wheels; *e*, *f*, position of bag.
FIG. 4. The Hull Curculio-catcher; viewed from above.
FIG. 5. Strips of sheeting for closing up the tree-way in Hull's Curculio-catcher.
FIG. 6. The Hooten Curculio-catcher.

FIG. 7. Sigalphus Curculio-parasite (*Sigalphus curculionis* Fitch); *a*, male; *b*, female; *c*, antenna.
FIG. 8. Sigalphus Curculio-parasite (*Sigalphus curculionis* Fitch); *a*, larva; *b*, cocoon; *c*, pupa.
FIG. 9. Porizon Curculio-parasite (*Porizon conotracheli* Riley); *a*, ♀; *b*, ♂; *c*, antenna.
FIG. 10. Apple Curculio (*Anthonomus quadrigibbus* Say); *a*, natural size; *b*, side view; *c*, back view.
FIG. 11. Apple Curculio (*Anthonomus quadrigibbus* Say); *a*, pupa; *b*, larva.
FIG. 12. Quince Curculio (*Conotrachelus cratægi* Walsh.); *a*, side; *b*, back.
FIG. 13. Plum Gouger (*Anthonomus prunicida* Walsh.).
FIG. 14. Strawberry Crown-borer (*Analcis fragariæ* Riley); *a*, larva; *b*, side view of beetle; *c*, dorsal view.
FIG. 15. Pea-weevil (*Bruchus pisi* Linn.); *a*, beetle; *b*, injured pea.
FIG. 16. Pea-weevil (*Bruchus pisi* Linn.), egg enlarged.
FIG. 17. Pea-weevil (*Bruchus pisi* Linn.); *b*, beetle, side view; *c*, larva; *d*, pupa, dorsal view; *g*, pea, infested. [After Curtis.]
FIG. 18. Grain Bruchus (*Bruchus granarius* Linn.). [After Curtis.]
FIG. 19. American Bean-weevil (*Bruchus fabæ* Riley); *a*, beetle; *b*, bean, infested.
FIG. 20. New York Weevil (*Ithycerus novæboracensis*, Forster); *a*, excavation made by female to deposit eggs; *b*, larva; *c*, beetle.
FIG. 21. Imbricated Snout-beetle (*Epicærus imbricatus*, Say).
FIG. 22. Corn Sphenophorus (*Sphenophorus zeæ* Walsh); *a*, back view; *b*, outline side view; *c*, enlarged punctures of elytra.
FIG. 23. Cocklebur Sphenophorus (*Sphenophorus pulchellus* Schœn.); *a*, back view; *b*, outline side view.
FIG. 24. Grape Leaf-folder (*Desmia maculalis* Westw.); 1, caterpillar in folded leaf; 2, enlarged view of head and anterior joints; 3, chrysalis; 4, male moth; 5, female moth.
FIG. 25. Grape-vine Epimenis (*Psychomorpha epimenis*, Drury); *a*, larva; *b*, side view of one segment, enlarged; *c*, hump on 11th joint, enlarged.
FIG. 26. Grape-vine Epimenis (*Psychomorpha epimenis*, Drury), moth, male.
FIG. 27. Grape-vine Plume (*Pterophorus periscelidactylus* Fitch); *a*, caterpillars in their retreat; *b*, chrysalis; *c*, one of the dorsal processes of chrysalis; *d*, moth; one joint of larva enlarged, side view.
FIG. 28. Yellow-bear Caterpillar (*Spilosoma virginica*, Fabr.); *a*, caterpillar; *b*, chrysalis; *c*, moth.
FIG. 29. Smeared Dagger (*Acronycta oblinita*, Sm. & Abb.); *a*, caterpillar; *b*, cocoon; *c*, moth.
FIG. 30. *Aleiodes Rileyi* Cress.; hardened skin of caterpillar of the Smeared Dagger (*Acronycta oblinita*, Sm. & Abb.) from which the *Aleiodes* has emerged.
FIG. 31. Pyramidal Grape-vine Worm (*Amphipyra pyramidoides* Guen.), moth.
FIG. 32. Pyramidal Grape-vine Worm (*Amphipyra pyramidoides* Guen.).
FIG. 33. Grape-root Borer (*Ægeria polistiformis* Harr.); *a*, male; *b*, female.
FIG. 34. Spotted Pelidnota (*Pelidnota punctata*, Linn.); *a*, larva; *b*, pupa; *c*, beetle; *d*, anal joint of larva; *e*, antenna of larva; *f*, leg of larva.
FIG. 35. Grape-vine Flea-beetle (*Haltica chalybea* Illiger); *a*, larvæ on leaf; *b*, larva, enlarged; *c*, earthen cell containing pupa; *d*, beetle. [*d* after Harris.]
FIG. 36. Grape-vine Flea-beetle (*Haltica chalybea* Illiger). [From *Practical Entomologist.*]
FIG. 37. Grape-vine Colaspis (*Colaspis flavida* Say); 1, enlarged; 2, natural size.
FIG. 38. Grape-vine Colaspis (*Colaspis flavida* Say); *a*, enlarged side view of larva; *b*, terminal joints seen from beneath.
FIG. 39. Galls of the Grape Phylloxera (*Phylloxera vitifoliæ*, Fitch = *vastatrix* Pl.).

FIG. 40. Grape Phylloxera (*Phylloxera vitifoliæ*, Fitch = *Ph. vastatrix* Pl.); *a*, the winged female; *b*, her foot or tarsus—after Signoret; *c*, egg; *d*, newly-hatched gall-inhabiting type; *e*, same, dorsal view; *f*, section of gall; *g*, tubercled root-inhabiting form; *h*, mother gall-louse at height of her fertility; *i*, same, dorsal view; *j*, *k*, differently veined wings of the Oak Phylloxera of Europe.

FIG. 41. Great Lebia (*Lebia grandis* Hentz.).

FIG. 42. Boll-worm (*Heliothis armigera* Hübn.) on tomato.

FIG. 43. Boll-worm (*Heliothis armigera* Hübn.); *a*, egg, side view; *b*, egg, top view; *c*, caterpillar; *d*, chrysalis in carthen cocoon; *e*, moth, wings expanded; *f*, moth, wings closed. [*a*, *b*, *c*, *d* after Glover.]

FIG. 44. Army-worm (*Leucania unipuncta* Haw.).

FIG. 45. Fall Army-worm (*Prodenia autumnalis* Riley=*Laphygma frugiperda*, Sm. & Abb.); *a*, natural size; *b*, head magnified; *c*, one segment enlarged, from above; *d*, same, from side.

FIG. 46. Fall Army-worm (*Prodenia autumnalis* Riley=*Laphygma frugiperda*, Sm. & Abb.); *a*, *b*, *c*, three varieties.

FIG. 47. Army-worm Moth (*Leucania unipuncta* Harr.).

FIG. 48. Spiderwort Owlet-moth (*Prodenia commelinæ*, Abb.); *a*, caterpillar; *b*, *c*, dark and light varieties of the moth. [See Notes, etc., p. 56.]

FIG. 49. Unarmed Rustic (*Agrotis inermis* Harr.=*A. saucia* Hübn.); *a*, egg, enlarged; *b*, batch of eggs, natural size.

FIG. 50. Apple-tree Tent-caterpillar (*Clisiocampa americana* Harr.); *a*, *b*, caterpillars; *c*, eggs; *d*, cocoon.

FIG. 51. Apple-tree Tent-caterpillar (*Clisiocampa americana* Harr.) moth.

FIG. 52. Tent-caterpillar of the Forest (*Clisiocampa sylvatica* Harr.); *a*, eggs; *b*, female moth; *c*, egg enlarged, top view; *d*, enlarged eggs, side view.

FIG. 53. Tent-caterpillar of the Forest (*Clisiocampa sylvatica* Harr.).

FIG. 54. Rummaging Ground-beetle (*Calosoma scrutator*, Fabr.).

FIG. 55. Fall Web-worm (*Hyphantria textor* Harr.); *a*, caterpillar; *b*, chrysalis; *c*, moth.

FIG. 56. Blue-spangled Peach-worm (*Callimorpha fulvicosta* Clem.); *a*, caterpillar; *b*, moth; *c*, one segment enlarged, side view; *d*, same, top view.

FIG. 57. Ash-gray Pinion (*Xylina cinerea* Riley); *a*, worm in fruit; *b*, moth.

FIG. 58. Glassy-winged Soldier-bug (*Campyloneura vitripennis*, Say).

FIG. 59. Glassy-winged Soldier-bug (*Campyloneura vitripennis*, Say), pupa.

FIG. 60. White-lined Morning Sphinx (*Deilephila lineata*, Fabr.), moth.

FIG. 61. White-lined Morning Sphinx (*Deilephila lineata*, Fabr.), caterpillar, light form.

FIG. 62. White-lined Morning Sphinx (*Deilephila lineata*, Fabr.); caterpillar, dark form.

FIG. 63. Archippus Butterfly (*Danais archippus*, Fabr.).

FIG. 64. Archippus Butterfly (*Danais archippus*, Fabr.); *a*, egg, greatly enlarged; *c*, natural size; *e*, *f*, lateral and dorsal views of a segment of the larva in its first stage, enlarged; *b*, larva in act of casting its skin, to show how the flexible horns are folded (*d*).

FIG. 65. Archippus Butterfly (*Danais archippus*, Fabr.), caterpillar.

FIG. 66. Archippus Butterfly (*Danais archippus*, Fabr.); *a*, *b*, *c*, successive stages in changing from caterpillar to chrysalis.

FIG. 67. Archippus Butterfly (*Danais archippus*, Fabr.), chrysalis.

FIG. 68. Disippus Butterfly (*Limenitis disippus*, Godt.), showing upper surface of left wing, and under surface on the right. [After Harris.]

FIG. 69. Disippus Butterfly (*Limenitis disippus*, Fabr.); *a*, egg greatly enlarged; *c*, natural size; *d*, one cell of the egg-shell, greatly magnified; *b*, one segment of the larva, in its first stage.

FIG. 70. Disippus Butterfly (*Limenitis disippus*, Fabr.); *a*, caterpillar; *b*, chrysalis; *c*, hibernaculum; *d*, leaf cut for hibernaculum.

FIG. 71. Disippus Butterfly (*Limenitis disippus*, Fabr.); a leaf eaten by the caterpillar.
FIG. 72. Disippus Egg-parasite (*Trichogramma? minuta* Riley); *a*, fly with wings folded; *b*, front wing; *c*, hind wing; *d*. leg; *e*, antenna — all enlarged.
FIG. 73. *Microgaster militaris* Walsh. [After Walsh.]

REPORT IV.

FIG. 1. Perforated tin box for sifting paris green.
FIG. 2. Creighton's "Improved Patent Insect Destroyer."
FIG. 3. Grand-Daddy-Long-Legs (*Phalangium dorsatum* Say).
FIG. 4. Fifteen-spotted Ladybird (*Mysia* 15-*punctata*, Oliv.); *a*, larva; *b*, pupa; *c*, first joint of larva, enlarged; *d*, *e*, *f*, *g*, different varieties of the beetle.
FIG. 5. Icy Ladybird (*Hippodamia glacialis* Fabr.).
FIG. 6. Ring-banded Soldier-bug (*Perillus circumcinctus* Stål); *b*, antenna; *c*, beak (enlarged).
FIG. 7. Dotted-legged Plant-bug (*Euschistus punctipes*, Say); *c*, beak (enlarged).
FIG. 8. Spined Soldier bug (*Arma spinosa* Dallas); *a*, beak (enlarged).
FIG. 9. Spined Soldier-bug (*Arma spinosa* Dallas); *a*, pupa; *b*, larva; *c*, egg (all enlarged).
FIG. 10. Rove-beetle (*Philonthus apicalis*, Say).
FIG. 11. Rove-beetle larva (*Goërius olens*). [After Westwood.]
FIG. 12. Rove-beetle (*Quedius molochinus*, Grav.), pupa.
FIG. 13. Wier's Apple-worm Trap.
FIG. 14. Pennsylvania Soldier-beetle (*Chauliognathus pensylvanicus* DeG.); *a*, larva; *b*, head and prothorax, enlarged; *c*, labium; *d*, labrum; *e*, leg; *f*, maxilla; *g*, antenna; *h*, mandible.
FIG. 15. Two-lined Soldier-beetle (*Telephorus bilineatus*, Say); *a*, larva; *b*, anterior joints enlarged; *c*, beetle.
FIG. 16. Grape-vine Colaspis (*Colaspis flavida* Say); one joint of larva, viewed from beneath and enlarged; *b*, head of larva, from beneath; *c*, same, from above, enlarged.
FIG. 17. Harlequin Cabbage-bug (*Strachia histrionica* Hahn); *a*, larva; *b*, pupa; *c*, eggs; *d*, eggs enlarged, side view; *e*, same, top view; *g*, bug; *h*, same, with wings expanded.
FIG. 18. Rascal Leaf-crumpler (*Phycita nebulo* Walsh); *a*, case, containing caterpillar; *b*, cases in winter; *c*, head and thoracic joints of larva, enlarged; *d*, moth.
FIG. 19. Larval cases of the Rascal Leaf-crumpler (*Phycita nebulo* Walsh) in winter.
FIG. 20. Walnut Case-bearer (*Acrobasis juglandis* LeBaron); *a*, case between two leaflets; *b*, case; *c*, wings of *nebulo* for comparison; *d*, wings of moth; *e*, wings of a variety of same from the crab-apple.
FIG. 21. Apple-leaf Skeletonizer (*Pempelia Hammondi* Riley); *a*, larva; *b*, middle joint, enlarged; *c*, anterior joints, enlarged; *d*, moth.
FIG. 22. Green Apple-leaf-tyer (*Tortrix cinderella* Riley); *a*, caterpillar; *b*, chrysalis; *c*, moth; *d*, pupal case.
FIG. 23. Apple-leaf Bucculatrix (*Bucculatrix pomifoliella* Clem.); *a*, cocoons on twig; *b*, cocoon, enlarged; *c*, moth.
FIG. 24. Apple-twig Borer (*Bostrichus bicaudatus*, Say). [After Walsh.]
FIG. 25. Apple-twig Borer (*Bostrichus bicaudatus*, Say); twigs bored by this insect.
FIG. 26. Red-shouldered Sinoxylon (*Sinoxylon basilare*, Say); *a*, larva; *b*, pupa; *c*, beetle.
FIG. 27. Red-shouldered Sinoxylon (*Sinoxylon basilare*, Say); *a*, head and thoracic joints of larva greatly enlarged; *b*, labrum and mandibles; *c*, anterior leg; *d*, intermediate leg; *e*, posterior leg.

FIG. 28. Grape Phylloxera (*Phylloxera vitifoliæ*, Fitch = *Ph. vastatrix* Pl.); *a*, shows a healthy root; *b*, one on which the lice are working, representing the knots and swellings caused by their punctures; *c*, a root that has been deserted by them, and where the rootlets have commenced to decay; *d*, *d*, *d*, shows how the lice are found on the larger roots; *e*, female pupa, dorsal view; *f*, same, ventral view; *g*, winged female, dorsal view; *h*, same, ventral view; *i*, magnified antenna of winged insect; *j*, side view of the wingless female, laying eggs on roots; *k*, shows how the punctures of the lice cause the larger roots to rot.
FIG. 29. Mulberry Silkworm (*Bombyx mori* Linn.), larva.
FIG. 30. Mulberry Silkworm (*Bombyx mori* Linn.), cocoon.
FIG. 31. Mulberry Silkworm (*Bombyx mori* Linn.), moth.
FIG. 32. Mulberry Silkworm (*Bombyx mori* Linn.), cocoons; *a*, White French Annual; *b*, Yellow French Annual; *c*, Green Japanese Annual; *d*, White Japanese Annual; *e*, White Chinese Annual.
FIG. 33. Cecropia Silkworm Moth (*Attacus Cecropia* Linn.).
FIG. 34. Cecropia Silkworm (*Attacus Cecropia* Linn.), cocoon.
FIG. 35. Cecropia Silkworm (*Attacus Cecropia* Linn.), chrysalis.
FIG. 36. Cecropia Silkworm (*Attacus Cecropia* Linn.).
FIG. 37. *Ophion macrurum*, Linn. [After Packard.]
FIG. 38. *Ophion macrurum*, Linn., larva.
FIG. 39. Mary Chalcis-fly (*Chalcis mariæ* Riley).
FIG. 40. Cecropia Cryptus (*Cryptus samiæ* Pack.), cocoons within the larger Cecropia cocoon.
FIG. 41. Cecropia Cryptus (*Cryptus samiæ* Pack.); *a*, female; *b*, female abdomen of *C. nuncius*; *c*, male abdomen; *d*, highly magnified piece of wing.
FIG. 42. Ailanthus Silkworm (*Attacus cynthia*, Hübn.); 1, caterpillar; 2, moth; 3, cocoon; 4, chrysalis; 5, eggs.
FIG. 43. Promethia Silkworm (*Attacus promethea* Drury); *a*, third stage; *b*, head in fourth stage, enlarged; *c*, lateral view of a joint in fourth stage, enlarged; *d*, full-grown caterpillar.
FIG. 44. Promethia Silkworm (*Attacus promethea* Drury), cocoon.
FIG. 45. Promethia Moth (*Attacus promethea* Drury), male. [After Harris.]
FIG. 46. Promethia Moth (*Attacus promethea* Drury), female. [After Harris.]
FIG. 47. Luna Moth (*Attacus Luna* Linn.). [After Harris.]
FIG. 48. Luna Silkworm (*Attacus Luna* Linn.).
FIG. 49. Luna Silkworm (*Attacus Luna* Linn.), cocoon. [After Harris.]
FIG. 50. Polyphemus Moth (*Attacus Polyphemus* Linn.), male.
FIG. 51. Polyphemus Moth (*Attacus Polyphemus* Linn.), female. [After Harris.]
FIG. 52. Polyphemus Silkworm (*Attacus Polyphemus* Linn.). [After Trouvelot.]
FIG. 53. Polyphemus Silkworm (*Attacus Polyphemus* Linn.), cocoon. [After Trouvelot.]
FIG. 54. Polyphemus Silkworm (*Attacus Polyphemus* Linn.), chrysalis. [After Trouvelot.]
FIG. 55. Yama-maï Moth (*Attacus yama-maï*, Guér.-Mén.), male.
FIG. 56. Yama-maï Silkworm (*Attacus yama-maï*, Guér.-Mén.); egg, natural size and enlarged; young caterpillar on leaf; full grown caterpillar at rest on twig.
FIG. 57. Yama-maï Silkworm (*Attacus yama-maï*, Guér.-Mén.), at rest on leafy twig, at *a*. [After Adams.]
FIG. 58. Yama-maï Silkworm (*Attacus yama-maï*, Guér.-Mén.), cocoon.
FIG. 59. Cage for receiving the deposition of the eggs of Yama-maï Moth. [After Adams.]
FIG. 60. Pernyi Moth (*Attacus Pernyi*, Guér.-Mén.).
FIG. 61. Pernyi Silkworm (*Attacus Pernyi*, Guér.-Mén.); egg, natural size and enlarged cocoon.

FIG. 62. Horned Passalus (*Passalus cornutus* Fabr.); *a*, larva; *b*, pupa; *c*, beetle; *d*, under side of three thoracic joints of larva, showing legs; *e*, metathoracic leg of larva.

FIG. 63. Great Leopard-moth (*Ecpantheria scribonia*, Stoll.), *a*, caterpillar; *b*, one hair, enlarged.

FIG. 64. Great Leopard-moth (*Ecpantheria scribonia*, Stoll.); *a*, female; *b*, male.

FIG. 65. Isabella Tiger-moth (*Arctia isabella*, Smith); *a*, caterpillar; *b*, chrysalis; *c*, moth.

FIG. 66. Acorn-moth (*Holcocera glandulella* Riley); *a*, caterpillar in acorn; *b*, perforated acorn; *c*, head and thoracic joints of caterpillar, enlarged; *d*, *e*, lateral and dorsal views of one segment of larva; *f*, moth; *g*, base of antenna of male.

REPORT V.

FIG. 1. Pyramid, showing the nature of the mouth, the relative rank of the Orders and the affinitives of the Sub-orders of Insects.

FIG. 2. Bald-faced Hornet (*Vespa maculata* Linn.). [After Sanborn.]

FIG. 3. Goldsmith-beetle (*Cotalpa lanigera*, Linn.).

FIG. 4. *Dëiopëia bella*, Drury.

FIG. 5. Dotted-legged Plant-bug (*Euschistus punctipes*, Say).

FIG. 6. Buffalo Tree-hopper (*Ceresa bubalus*, Fabr.); *a*, side view; *b*, view from above.

FIG. 7. Missouri Bee-killer (*Asilus missouriensis* Riley).

FIG. 8. Differential Locust (*Caloptenus differentialis* Walk.).

FIG. 9. Dragon-fly (*Libellula trimaculata*, DeGeer.) [After Sanborn.]

FIG. 10. Hull's Curculio-catcher.

FIG. 11. Butterfly net; *b*, hinge in the ring; *c*, ring folded; *d*, nut sunk and soldered into brass tube at end of handle; *e*, screw; *f*, tip of handle, showing attachment of the ring.

FIG. 12. Butterfly net; *a*, ring; *b*, socket; *c*, cork plug.

FIG. 13. Butterfly net, head for attaching the ring to the rod.

FIG. 14. Poison-bottle for killing insects; *a*, wadding to keep the cyanide grains in place.

FIG. 15. Chloroform in stoppered bottle with brush.

FIG. 16. Chloroform in bottle with tube passing through the cork.

FIG. 17. Method of pinning insects; *a*, beetle; *b*, bug.

FIG. 18. Method of carding small insects.

FIG. 19. Method of "setting" Lepidoptera on a spreading board.

FIG. 20. Setting-needle.

FIG. 21. Sections of framework of glass-covered volume to display showy insects; *a*, ends; *b*, front; *c*, back.

FIG. 22. Forceps for pinning insects.

FIG. 23. Forceps for pinning insects.

FIG. 24. Forceps for pinning insects.

FIG. 25. Breeding-cage; *a*, bottom board; *b*, four-sided frame, with glass sides and door, fitting over a zinc pan (*ff*) attached to the bottom board; *c*, cover fitting to the frame and having a wire gauze top; *d*, zinc tube attached in centre of the pan, to contain a bottle for the reception of the food plant; *e*, sand in the pan; *gg*, cross pieces for supporting the cage and to prevent warping.

FIG. 26. Ring-legged Pimpla (*Pimpla annulipes* Br.), female; to the right a figure of the ovipositor to show the two inner rods; to the left the abdomen of the male.

FIG. 27. Delicate Longsting (*Macrocentrus delicatus* Cress.); to the right the abdomen of the male.

FIG. 28. Rust-red Social Wasp (*Polistes rubiginosus* St. Farg.); *b*, nest, the natural position being with the mouths of the cells down.

FIG. 29. Apple-tree Tent-caterpillar (*Clisiocampa americana* Harr.), eggs.

FIG. 30. Grape Phylloxera (*Phylloxera vastatrix* Plan.); *a*, *b*, peculiar pedunculated galls; *c*, gall just forming; *d*, same from beneath.

FIG. 31. Oyster-shell Bark-louse (*Mytilaspis pomicorticis* Riley); *a*, male louse from beneath; *b*, same from above and with wings expanded; *c*, male scale; *d*, leg of male; *e*, portion of wing very highly magnified; *f*, one joint of male antennæ (all highly magnified).

FIG. 32. Oyster-shell Bark-louse (*Mytilaspis pomicorticis* Riley); anal joint of louse, with a more highly magnified segment of edge at *b*, and of a single pore at *c*; *d*, female louse; *e*, a section of its proboscis more highly magnified; *g h f*, female scale, *h*, first scale, *g*, second scale, *f*, third scale.

FIG. 33. Mite (*Dermaleichus ?*).

FIG. 34. *Aphelinus mytilaspidis* LeBaron.

FIG. 35. Pine-leaf Scale-insect (*Mytilaspis pinifoliæ*, Fitch.); *a*, scales on leaves of white pine; *b*, male scale; *c*, female scale from white pine; *d*, female scale from broader leaved pine (*b*, *c* and *d*, enlarged).

FIG. 36. Pine-leaf Scale-insect (*Mytilaspis pinifoliæ*, Fitch); male, highly magnified.

FIG. 37. Painted Ladybird (*Coccinella picta* Randall); *a*, larva; *b*, beetle; *c*, beetle, enlarged.

FIG. 38. Hickory Bark-borer (*Scolytus caryæ* Riley); 1, view of its galleries on the inside of the bark, showing the beetle in the central gallery and the larvæ at the ends of the side galleries; 2, burrows made by larger larvæ; 3, beetle, magnified and natural size; 4, larva, magnified and natural size; 5, pupa, magnified; 6, sculpture of elytra, magnified.

FIG. 39. Rose Chafer (*Macrodactylus subspinosus*, Fabr.), with the enlarged anterior tibia at the left.

FIG. 40. Chinch-bug (*Micropus leucopterus*, Say).

FIG. 41. False Chinch-bug (*Nysius destructor* Riley); *a*, potato leaf showing some effects of its punctures; *b*, pupa; *c*, mature bug.

FIG. 42. Grape-vine Apple-gall (*Vitis-pomum* Walsh & Riley); *a*, exterior; *b*, section.

FIG. 43. Gall-gnat (*Cecidomyia salicis-strobiloides* Walsh), *a*, female; *b*, male antennæ.

FIG. 44. Grape-vine Filbert-gall (*Vitis-coryloides* W. & R.); *a*, anterior joints of larva, showing breast-bone; *b*, cluster of galls; *c*, section of single gall.

FIG. 45. Grape-vine Tomato-gall (*Vitis-tomatos* Riley = *Lasioptera vitis* O. S., gall); *a*, section of a single swelling.

FIG. 46. Grape-vine Trumpet-gall (*Vitis-viticola* Riley = *Cecidomyia viticola* O. S.)

FIG. 47. Jumping Tree-cricket (*Orocharis saltator* Uhler) eggs in grape twig; *a*, eggs; *b*, punctures; *c*, egg, enlarged.

FIG. 48. Jumping Tree-cricket (*Orocharis saltator* Uhler); *a*, female; *b*, male.

FIG. 49. Snowy Tree-cricket (*Œcanthus niveus* Harr.) eggs; *a*, punctures in twig; *b*, section of twig showing the eggs within; *c*, egg, enlarged; *d*, granulations at rounded end of egg, more highly magnified.

FIG. 50. Buffalo Tree-hopper (*Ceresa bubalus* Fabr.) eggs in slits in the bark of a tree; *a*, one slit enlarged; *b*, natural size.

FIG. 51. Buffalo Tree-hopper (*Ceresa bubalus*, Fabr.); *a*, side; *b*, dorsal view.

FIG. 52. Buffalo Tree-hopper (*Ceresa bubalus*, Fabr.); *a*, larva; *b*, pupa; *c*, ovipositor of the female, all enlarged.

FIG. 53. Egg-punctures of Tree-hopper (?) on apple twigs; *a*, natural size; *b*, enlarged.

FIG. 54. Frosted Lightning-hopper (*Pœciloptera pruinosa*, Say) eggs; *a*, enlarged; *b*, in position within twig, enlarged; *c*, natural size.

FIG. 55. Frosted Lightning-hopper (*Pœciloptera pruinosa*, Say).

FIG. 56. Egg-punctures of (?) *Orchelimum glaberimum* (Burm.).

FIG. 57. Eggs of the Angular-winged Katydid (*Microcentrus retinervis*, Burm.); *a*, front; *b*, side view, just before hatching.

FIG. 58. Eggs of the Angular-winged Katydid (*Microcentrus retinervis*, Burm.); *a*, front; *b*, side view, soon after laid.
FIG. 59. Eggs of the Broad-winged Katydid (*Platyphyllum concavum* Harr.); *a*, side; *b*, front view, enlarged; *c*, *d*, natural size.
FIG. 60. Buck Moth (*Hemileuca maia*, Drury).
FIG. 61. Buck Moth (*Hemileuca maia*, Drury) eggs.
FIG. 62. Buck Moth (*Hemileuca maia*, Drury); *a*, full-grown larva; *b*, pupa; *c*, ordinary form of spine of larva in the first stage; *d*, branched spine on thoracic joints of same; *e*, form of spines in second stage of larva; *f*, *g*, spines of fuil-grown larva.
FIG. 63. Io Moth (*Hyperchiria Io*, Fabr.), male.
FIG. 64. Io Moth (*Hyperchiria Io*, Fabr.), female.
FIG. 65. Io Moth (*Hyperchiria Io*, Fabr.), caterpillar.
FIG. 66. Io Moth (*Hyperchiria Io*, Fabr.), spines in 1st (*c*), 2d (*b*), and 5th (*a*) stages of caterpillar.
FIG. 67. Green- striped Maple-worm (*Dryocampa rubicunda*, Fabr.); *a*, caterpillar; *b*, chrysalis; *c*, female moth.
FIG. 68. *Belvoisia bifasciata*, Fabr.
FIG. 69. Hellgrammite Fly (*Corydalus cornutus*, Linn.); *a*, larva; *b*, pupa; *c*, male fly; *d*, outline of head and prothorax of female.
FIG. 70. Hellgrammite Fly (*Corydalus cornutus*, Linn.); supposed eggs.
FIG. 71. Hellgrammite Fly (*Corydalus cornutus*, Linn.), pupa.
FIG. 72. Goat-weed Butterfly (*Paphia glycerium* Doubl.); *a*, leaf eaten by the larva (natural size); *b*, head of larva in the first stage; *c*, larva in third stage; *d*, head in second stage; *e*, head in fourth stage — all enlarged.
FIG. 73. Painted-wing Digger-wasp (*Ammophila pictipennis* Walsh).
FIG. 74. Yucca-moth (*Pronuba yuccasella* Riley); *a*, head with pollen mass (1), (2) the maxillary tentacle, (3) the maxillae, (4) maxillary palpi, (5) antenna; *b*, maxillary palpi with tentacle; *c*, single spine from maxillary tentacle; d, maxillary palpus of male; *e*, wing scale; *f*, anterior leg; *g*, labial palpus; *h*, venation of anterior wing; *i*, venation of posterior wing, male; *j*, last joint of the abdomen of the female with the ovipositor exserted — all enlarged.
FIG. 75. Yucca-moth (*Pronuba yuccasella* Riley); *a*, larva; *b*, moth with wings folded; *c*, female moth with wings expanded, (all natural size); *d*, side view of one joint of larva; *e*, head of larva from below; *f*, same from above; *g*, leg of larva; *h*, maxilla; *i*, mandible; *j*, labial palpi and spinneret; *k*, antenna — all enlarged.

REPORT VI.

FIG. 1. Potato-beetle Catcher. Made of five barrel hoops and four (BB. EE) barrel staves, covered with cotton cloth.
FIG. 2. Grape Phylloxera (*Phylloxera vastatrix* Planchon), galls on the leaf, seen from beneath.
FIG. 3. Grape Phylloxera (*Phylloxera vastatrix* Plan.); *a*, *b*, pedunculated galls; *c*, gall just forming; *d*, same from beneath.
FIG. 4. Grape Phylloxera (*Phylloxera vastatrix* Plan.)—Type Gallicola; *a*, *b*, newly-hatched larva, ventral and dorsal view; *c*, egg; *d*, section of gall; *e*, swelling of tendril; *f*, *g*, *h*, mother gall-louse—lateral, dorsal and ventral views; *i*, her antenna; *j*, her two-jointed tarsus.
FIG. 5. Grape Phylloxera (*Phylloxera vastatrix* Plan.)—Type Radicicola; *a*, roots of Clinton vine, showing relation of swellings to leaf galls, and power of resisting decomposition; *b*, larva as it appears when hibernating; *c*, *d*, antenna and leg of same; *e*, *f*, *g*, forms of more mature lice; *h*, granulations of skin; *i*, tubercle; *j*, transverse folds at border of joints; *k*, simple eyes.

FIG. 6. Grape Phylloxera (*Phylloxera vastatrix* Plan.)—Type Radicicola; *a*, shows a healthy root; *b*, one on which the lice are working, representing the knots and punctures caused by their punctures; *c*, a root that has been deserted by them, and where the rootlets have commenced to decay; *d*, *d*, *d*, show how the lice are found on the larger roots; *e*, female pupa, dorsal view; *h*, same, ventral view; *i*, magnified antenna of winged insect; *j*, side view of the wingless female, laying eggs on roots; *k*, shows how the punctures of the lice cause the larger roots to rot.

FIG. 7. Grape Phylloxera (*Phylloxera vastatrix* Plan.). Pterogostic characters; *a*, *b*, different venation of front wing; *c*, hind wing; *d*, *e*, *f*, showing development of wings.

FIG. 8. Grape Phylloxera (*Phylloxera vastatrix* Plan.)—Type Radicicola; *a*, *b*, pupa and imago of a problematical individual or supposed male; *c*, *d*, its antenna and leg; *e*, vesicles found in abdomen.

FIG. 9. Thrips, enlarged, wings at right more highly enlarged.

FIG. 10. Lace-wing fly (*Chrysopa* sp.); *a*, eggs; *b*, larva; *c*, cocoon, the upper figure with the lid open after the fly has escaped; *d*, fly, the wings omitted on the left. [*a*, *b*, *d*, after Westwood.]

FIG. 11. Ladybird (*Hippodamia convergens* Gué.); larva, pupa and beetle.

FIG. 12. Syrphus larva; *b*, one joint enlarged.

FIG. 13. Syrphus-fly (*Helophilus latifrons* Loew).

FIG. 14. Insidious Flower-bug (*Anthocoris insidiosus*, Say).

FIG. 15. Root-louse Syrphus-fly (*Pipiza radicum* W. & R.); *a*, larva; *b*, pupa; *c*, fly.

FIG. 16. Phylloxera Mite (*Tyroglyphus phylloxeræ* Planchon & Riley); *a*, dorsal; *b*, ventral view of female; *c*, mouth parts; *d*, *f*, *g*, *h*, forms of tarsal appendages; *e*, ventral tubercles of male.

FIG. 17. *Hoplophora arctata* Riley; *a*, *b*, *c*, *d*, *e*, different attitudes assumed by it; *f*, strongly magnified leg.

FIG. 18. American Oak Phylloxera (*Phylloxera Rileyi* Lichtn.); *a*, pupa; *b*, winged females; *c*, antenna greatly enlarged; *d*, portion of infested leaf, under side.

FIG. 19. American Oak Phylloxera (*Phylloxera Rileyi* Lichtn.); *a*, *b*, dorsal and ventral views of larva as seen hibernating; *c*, *d*, highly magnified leg and antenna of same.

FIG. 20. Grape-vine Epimenis (*Psychomorpha epemenis*, Drury); *a*, larva; *b*, one joint, enlarged, side view; *c*, hump on joint 11.

FIG. 21. Grape-vine Epimenis (*Psychomorpha epimenis*, Drury), male moth.

FIG. 22. Beautiful Wood-nymph (*Eudryas grata*, Fabr.); *a*, full grown larva; *b*, one joint, enlarged, side view; *c*, cervical shield from behind; *d*, anal hump from behind; *e*, *f*, top and side views of egg.

FIG. 23. Beautiful Wood-nymph (*Eudryas grata*, Fabr.), female moth.

FIG. 24. Pearl Wood-nymph (*Eudryas unio*, Hübn.), male moth.

FIG. 25. Eight-spotted Forester (*Alypia octomaculata*, Fabr.); *a*, larva; *b*, one joint, enlarged, side view; *c*, female moth.

FIG. 26. Red-legged Ham-beetle (*Corynetes rufipes*, Fabr.); *a*, larva; *b*, pupa; *c*, cocoon; *d*, beetle, enlarged; *e*, same, natural size; *f*, leg of larva; *g*, mandible, *h*, labium, *i*, maxilla, *j*, antenna, of larva—all enlarged.

FIG. 27. Larder-beetle (*Dermestes lardarius* Linn.); *a*, larva; *b*, one of its barbed hairs; *c*, beetle.

FIG. 28. Clover-hay Worm (*Asopia costalis*, Fabr.); 1, 2, larva; 3, cocoon; 4, chrysalis; 5, 6, moth with wings expanded, and closed; 7, worm covered with silken web.

FIG. 29. Legged Maple Borer (*Æjeria acerni*, Clem.); *a*, *a*, larva, dorsal and lateral views; *b*, *b*, *b*, cocoons exposed by detachment of bark; *c*, moth; *d*, chrysalis skin as it is often left remaining in the hole of exit.

FIG. 30. Raspberry-root Borer (*Ægeria rubi* Riley); *a*, male moth; *b*, female moth.
FIG. 31. Northern Brenthian (*Eupsalis minuta*, Drury); *a*, larva; *b*, pupa; *c*, female beetle; *d*, head of male do.; *f*, leg of larva; *g*, head of larva, from in front; *h*, labium; *i*, labrum; *j*, mandible; *k*, maxilla; *l*, head from beneath, all of larva and enlarged; *m*, end of body of pupa, dorsal view.
FIG. 32. Larva of Tenebrionid (?); *b*, front view of head; *c*, mandible; *f*, antenna; *g*, maxilla; *h*, labium; *d*, *e*, concave end of the body, full and side views.
FIG. 33. Sumach Flea-beetle (*Blepharida rhois*, Forst.); *a*, egg; *b*, *b*, egg-masses, covered with excrement; *c*, *c*, *c*, *c*, larva; *d*, cocoon; *e*, pupa; *f*, beetle; *g*, antenna of larva; *h*, maxilla do.; *i*, mandible do.; *j*, labium do.; *k*, labrum do.; *l*, leg do.
FIG. 34. *Tiphia inornata* Say; *a*, perfect wasp; *b*, head of larva, enlarged; *c*, larva, ventral view; *d*, cocoon cut open.
Report VI, p. 122. Jiggers (*Leptus irritans* Riley, to the right; *L. americanus* Riley, to the left).
FIG. 35. White-grub Fungus (*Torrubia ravenelii*, Berk.).
FIG. 36. Dominican Case-bearer (*Coscinoptera dominicana*, Fabr.); *a*, larva extracted from case; *b*, do. with case; *c*, beetle, showing punctures; *d*, same, natural size; *e*, egg, enlarged; *i*, eggs, natural size; *g*, head of male beetle, enlarged; *h*, mandible of same, more enlarged; *j*, leg of larva, with the claw joint more enlarged; *f*, under side of larva; *k*, its mandible; *l*, maxilla, all enlarged.
FIG. 37. *Chlamys plicata*, Oliv.; *a*, larva extracted from case, the figure at the right showing the larva in the case. [After Packard.]
FIG. 38. Yucca-moth (*Pronuba yuccasella* Riley); *m*, female chrysalis; *l*, male chrysalis, the apical joints more highly enlarged and viewed from the side in lower figure.
FIG. 39. Eyed Emperor (*Apatura lycaon*, Fabr.); *a*, eggs; *b*, larva; *c*, *d*, chrysalis, dorsal and lateral views; *e*, imago, male, the dotted line showing form of female — all natural size.
FIG. 40. Eyed Emperor (*Apatura lycaon*, Fabr.); *f*, egg, magnified; *g*, larva, lateral view; *h*, imago, under side — natural size; *i*, *j*, *k*, *l*, *m*, the five different larval heads; *n*, *o*, dorsal and lateral views of one joint of larva — enlarged.
FIG. 41. Tawny Emperor (*Apatura herse*, Fabr.); *a*, eggs; *b*, larva; *c*, chrysalis; *d*, imago, male, the dotted line showing form of female — all natural size.
FIG. 42. Tawny Emperor (*Apatura herse*, Fabr.); *g*, larva, half grown, dorsal view; *h*, imago, male, under side — natural size; *i*, *j*, *k*, *l*, *m*, the five different heads of larva; *n*, *o*, dorsal and lateral views of one joint of larva; *p*, egg — enlarged; *g*, larvæ as when hibernating — natural size.
FIG. 43. Eggs of the Angular-winged Katydid (*Microcentrus retinervis*, Burm.); *a*, front; *b*, side view, just before hatching.
FIG. 44. Eggs of Angular-winged Katydid (*Microcentrus retinervis*, Burm.); *a*, front; *b*, side view, soon after laid.
FIG. 45. Angular-winged Katydid (*Microcentrus retinervis*, Burm.); male wings closed.
FIG. 46. Angular-winged Katydid (*Microcentrus retinervis*, Burm.); *a*, ovipositor of female, nat. size; *b*, tip of same, enlarged.
FIG. 47. Angular-winged Katydid (*Microcentrus retinervis*, Burm.); female ovipositing.
FIG. 48. Back-rolling Wonder (*Antigaster mirabilis* Walsh); *a*, female, wings expanded; *b*, same, side view, partly rolled up; *c*, same nearly rolled up; *d*, antenna of same.
FIG. 49. Back-rolling Wonder (*Antigaster mirabilis* Walsh); *a*, eggs of *Microcentrus* from which it has issued; *b*, female pupa, ventral view; *c*, male fly; *d*, his antenna.
FIG. 50. Narrow-winged Katydid (*Phaneroptera curvicauda*, DeGeer); female. [After Harris.]

FIG. 51. Narrow-winged Katydid (*Phaneroptera curvicauda* DeGeer); *a*, ovipositor of female, nat. size; *d*, end of same, enlarged; *c*, anal appendage of male, side view; *b*, same, back view.

FIG. 52. Broad-winged Katydid (*Platyphyllum concavum* Harr.); male (after Harris). [Adapted from Harris.]

FIG. 53. Broad-winged Katydid (*Platyphyllum concavum* Harr.); *a*, ovipositor of female, nat. size; *b*, end of same, enlarged.

FIG. 54. Eggs of Broad-winged Katydid (*Platyphyllum concavum* Harr.); *a*, side; *b*, front view—enlarged; *c*, *d*—natural size.

FIG. 55. Oblong-winged Katydid (*Phylloptera oblongifolia*, DeGeer), outline of female [adapted from Harris]; *b*, end of ovipositor, enlarged.

REPORT VII.

FIG. 1. Gray's Improved Sprinkler, for the use of Paris Green water. [From inventor.]

FIG. 2. Chinch-bug (*Micropus leucopterus*, Say).

FIG. 3. Chinch-bug (*Micropus leucopterus*, Say); *a*, *b*, eggs; *c*, newly hatched larva; *d*, its tarsus; *e*, larva after first molt; *f*, same after second molt; *g*, pupa, the natural sizes indicated at sides; *h*, enlarged leg of perfect bug; *j*, tarsus of same still more enlarged; *i*, proboscis or beak, enlarged.

FIG. 4. Chinch-bug (*Micropus leucopterus*, Say), short-winged form.

FIG. 5. Spotted Ladybird (*Hippodamia maculata*, DeGeer). [From *Practical Entomologist.*]

FIG. 6. Trim Ladybird (*Coccinella munda* Say).

FIG. 7. Insidious Flower-bug (*Anthocoris insidiosus*, Say).

FIG. 8. Many-banded Robber (*Harpactor cinctus*, Fabr.); *a*, bug; *b*, its beak, enlarged.

FIG. 9. False Chinch-bug (Nysius destructor Riley); *b*, pupa; *c*, mature bug.

FIG. 10. Ash-gray Leaf-bug (*Piesma cinerea* Say).

FIG. 11. Flea-like Negro-bug (*Corimelæna pulicaria*, Germar); natural size and enlarged.

FIG. 12. Flat-headed Apple-tree Borer (*Chrysobothris femorata*, Fabr.); *a*, larva, dorsal view; *b*, pupa; *c*, swollen thoracic joints of larva from beneath; *d*, beetle.

FIG. 13. Cherished Bracon (*Bracon charus* Riley).

FIG. 14. Spring Canker-worm (*Anisopteryx vernata*, Peck); *a*, full grown larva; *b*, egg, enlarged, the natural size shown in the small mass at the side; *c*, *d*, one joint enlarged, side and dorsal views.

FIG. 15. Spring Canker-worm (*Anisopteryx vernata*, Peck); *a*, male moth; *b*, female do.—natural size; *c*, joints of her antennæ; *d*, joint of her abdomen, showing spines; *e*, her ovipositor—enlarged.

FIG. 16. Spring Canker-worm (*Anisopteryx vernata*, Peck); front view of head.

FIG. 17. Fall Canker-worm (*Anisopteryx pometaria* Harr.); *a*, *b*, egg, side and top views; *c*, *d*, side and top views of one joint of larva,—enlarged; *e*, batch of eggs; *f*, full grown larva; *g*, female chrysalis—natural size; *h*, top view of anal tubercle of chrysalis.

FIG. 18. Fall Canker-worm (*Anisopteryx pometaria* Harr); *a*, male moth; *b*, female do.—natural size; *c*, joints of her antennæ; *d*, joint of her abdomen—enlarged.

FIG. 19. Phylloxera, Male (*Phylloxera caryæcaulis*, Fitch?).

FIG. 20. Grafting; *a*, *b*, incisions to receive the scion; *d*, scion; *c*, string to secure scion—to prevent phylloxera injury.

FIG. 21. Grafting—to prevent phylloxera injury.

FIG. 22. American Oak Phylloxera (*Phylloxera rileyi* Licht.); *a*, male, ventral view; *b*, genital organ; *c*, tarsus—all greatly enlarged.

FIG. 23. Rocky Mountain Locust (*Caloptenus spretus* Thomas); *a, a, a,* female in different positions, ovipositing; *b,* egg-pod extracted from ground, with the end broken open, showing how the eggs are arranged; *c,* a few eggs lying loose on the ground; *d, e,* shows the earth partially removed, to illustrate an egg-mass already in place, and one being placed; *f,* shows where such a mass has been covered up.

FIG. 24. Rocky Mountain Locust (*Caloptenus spretus* Thomas); anal characters of female, showing horny valves of ovipositor; *b,* an upper valve; *c,* a lower valve—all enlarged.

FIG. 25. Rocky Mountain Locust (*Caloptenus spretus* Thomas); *a, a,* newly hatched larva; *b,* full grown larva; *c,* pupa.

FIG. 26. Red-legged Locust (*Caloptenus femur-rubrum,* DeG.).

FIG. 27. Rocky Mountain Locust (*Caloptenus spretus* Thomas).

FIG. 28. Rocky Mountain Locust (*Caloptenus spretus* Thomas); *a,* tip of abdomen of male, side view; *b, c,* hind and top views of tip—all enlarged.

FIG. 29. Red-legged locust (*Caloptenus femur-rubrum* DeGeer); *a,* tip of abdomen of male, side view; *b, c,* hind and top view—all enlarged.

FIG. 30. Migratory Locust of Europe (*Œdipoda migratoria* Linn.).

FIG. 31 (p. 142). *Map* of North America, illustrating the country east of the Rocky Mountains subject to the Ravages of the Rocky Mountain Locust.

(Opposite p. 144.) *Map* of Missouri, illustrating the Locust Invasion of 1874.

FIG. 32. Swarm of Locusts falling upon and devouring a wheat-field.

FIG. 33. Differential Locust (*Caloptenus differentialis,* Walk.).

FIG. 34. Two-striped Locust (*Caloptenus bivittatus,* Say).

FIG. 35. Silky Mite (*Trombidium sericeum* Say); natural size shown at side.

FIG. 36. Locust Mite (*Astoma gryllaria* LeBaron); greatly enlarged.

FIG. 37. Mite parasitic on the House-fly (*Trombidium muscarum* Riley); enlarged.

FIG. 38. Red-tailed Tachina-fly (*Exorista militaris* Kirkp.)

FIG. 39. Flesh-fly (*Sarcophaga sarraceniæ* Riley); *a,* larva; *b,* pupa; *c,* fly; *d,* head and prothoracic joints of larva, showing curved hooks, lower lip (more enlarged at *g*), and prothoracic spiracles; *e,* end of body of larva, showing stigmata (more enlarged at *f*), prolegs and vent; *h,* tarsal claws of fly with protecting pads; *i,* antenna of fly—all enlarged.

FIG. 40. Seventeen-year Locust (*Cicada septemdecim* Linn.); one wing removed so as to show ovipositor, *b*; *a,* beak.

REPORT VIII.

FIG. 1. *Lebia grandis* Hentz.

FIG. 2. Peck's Spray Machine in operation. [From inventor.]

FIG. 3. Spring Canker-worm (*Paleacrita vernata,* Peck); *a,* caterpillar; *b,* eggs, natural size, one enlarged; *c,* one joint of larva, enlarged, side view; *d,* same, dorsal view.

FIG. 4. Fall Canker-worm (*Anisopteryx pometaria* Harr.); *a, b,* egg enlarged, side and top views; *c, d,* joint of larva, enlarged, side and dorsal views; *e,* eggs, natural size; *f,* caterpillar; *g,* female chrysalis; *h,* tip of chrysalis, enlarged.

FIG. 5. Spring Canker-worm (*Paleacrita vernata,* Peck), female chrysalis, enlarged.

FIG. 6. Fall Canker-worm (*Anisopteryx pometaria* Harr.); *a,* male, *b,* female chrysalis, enlarged; a dorsal view of the tip of each shown beneath.

FIG. 7. Spring Canker-worm (*Paleacrita vernata,* Peck); *a, b,* venation of wings; *c,* one joint of male antennæ, greatly enlarged.

FIG. 8. Fall Canker-worm (*Anisopteryx pometaria* Harr.); *a, b,* venation of wings; *c, d,* one joint of male antennæ, greatly enlarged, side and under views.

FIG. 9. Spring Canker-worm (*Paleacrita vernata,* Peck); *a,* male moth; *b,* female moth—nat. size; *c,* portion of antenna of female; *d,* one segment of female abdomen; *e,* ovipositor—enlarged.

FIG. 10. Fall Canker-worm (*Anisopteryx pometaria* Harr.); *a*, male moth; *b*, female moth—nat. size; *c*, joints of female antenna; *d*, one joint of female abdomen—enlarged.
FIG. 11. Canker-worm Trap, consisting of a band of tin attached to a circle of muslin.
FIG. 12. Canker-worm Trap, of tin and muslin; section. [From *Country Gentleman.*]
FIG. 13. Canker-worm Trap, of tin and muslin; section to show the mode of union of the tin and muslin. [From *Country Gentleman.*]
FIG. 14. Canker-worm Trap, at base of tree—Section. [From *Country Gentleman.*]
FIG. 15. Canker-worm Trap, at base of tree. [From *Country Gentleman.*]
FIG. 16. Tent-caterpillar of the Forest (*Clisiocampa sylvatica* Harr.); *a*, eggs; *b*, female moth; *c*, egg, enlarged, top view; *d*, same, side view.
FIG. 17. Tent-caterpillar of the Forest (*Clisiocampa sglvatica* Harr.).
FIG. 18. Army-worm (*Leucania unipuncta* Haw.), male genitalia; A, end of body denuded of hairs, showing the upper clasps protruding, and the natural position of the hidden organs by dotted lines; B, the organs extended; *c*, upper valves; *d*, lower valves; *e*, upper intermediate organ; *f*, penis; *g*, back view of upper intermediate organ; *h*, inner surface of upper valves—all enlarged.
FIG. 19. Army-worm (*Leucania unipuncta* Haw.); *a*, *b*, end of abdomen of female denuded of scales, showing the ovipositor withdrawn and exserted; *c*, terminal joint of ovipositor; *d*, striations representing folds of the membrane, to facilitate expansion; *e*, *f*, retractile subjoints; *h*, eggs—all enlarged; *g*, eggs, natural size.
FIG. 20. Army-worm (*Leucania unipuncta* Haw.), natural size when full grown.
FIG. 21. Army-worm (*Leucania unipuncta* Haw.), chrysalis.
FIG. 22. Army-worm (*Leucania unipuncta* Haw.); *a*, male moth; *b*, abdomen of female—nat. size; *c*, eye, *d*, base of male antenna; *e*, base of female antenna—enlarged.
FIG. 23. Stalk-Borer (*Gortyna nitela* Guen.); *a*, terminal joints of female abdomen denuded to show the exserted ovipositor; *b*, view of the ovipositor from above.
FIG. 24. Unarmed Rustic (*Agrotis saucia* Treit.); *a*, top view of egg, enlarged; *b*, batch of eggs enlarged. [See Notes, etc., p. 55.]
FIG. 25. Unarmed Rustic (*Agrotis saucia* Treit.); *a*, ovipositor as it appears at the end of the abdomen; *b*, same when extended.
FIG. 26. Fall Army-worm (*Laphygma frugiperda*, Sm. & Abb.); *a*, full grown worm, nat. size; *b*, head, front view; *c*, one joint of body, dorsal view; *d*, do., side view—enlarged. [See Notes, etc., p. 56.]
FIG. 27. Fall Army-worm (*Laphygma frugiperda*, Sm. & Abb.); *a*, the typical form; *b*, *c*, variations of wings.
FIG. 28. Elongate Ground-beetle (*Pasimachus elongatus* Lec.).
FIG. 29. Murky Ground-beetle (*Harpalus caliginosus*, Fabr.).
FIG. 30. Fiery Ground-beetle (*Calosoma calidum*, Fabr.); *a*, larva; *b*, beetle.
FIG. 31. Rummaging Ground-beetle (*Calosoma scrutator*, Fabr.). [After Harris.]
FIG. 32. Red-tailed Tachina-fly (*Exorista leucaniæ* Kirk.). [After Walsh.]
FIG. 33. Yellow-tailed Tachina-fly (*Exorista flavicauda* Riley).
FIG. 34. *Microgaster militaris* Walsh. [After Walsh.]
FIG. 35. Glassy Mesochorus (*Mesochorus vitreus* Walsh). [After Walsh.]
FIG. 36. *Pezomachus minimus* Walsh. [After Walsh.]
FIG. 37. *Pezomachus minimus* Walsh, bunch of cocoons. [After Walsh.]
FIG. 38. *Ophion purgatus* Say.
FIG. 39. Rocky Mountain Locust (*Caloptenus spretus* Thomas): process of acquiring wings; *a*, pupa with skin just split on the back; *b*, the imago extending; *c*, do., nearly out; *d*, do. with wings expanded; *e*, do. with all parts perfect.
FIG. 40. *Acridium americanum*, Drury.
FIG. 41. Coral-winged Locust (*Œdipoda phœnicoptera* Germ.).

FIG. 42. White-lined Morning Sphinx (*Deïlephila lineata* Fabr.), green larva.
FIG. 43. White-lined Morning Sphinx (*Deïlephila lineata* Fabr.), black larva.
FIG. 44. White-lined Morning Sphinx (*Deïlephila lineata* Fabr.).
FIG. 45. Lubber Locust (*Brachypeplus magnus* Gir.).
FIG. 46. Green-striped Locust (*Tragocephala viridifasciata*); *a*, pupa; *b*, perfect insect.
FIG. 47. Granulated Grouse-locust (*Tettix granulata* Scudder).
FIG. 48. Grape Phylloxera (*Phylloxera vastatrix* Plan.); *a*, female, ventral view, showing egg through transparent skin; *b*, do. dorsal view; *c*, greatly enlarged tarsus; *d*, shrunken anal joints as they appear after oviposition; *e*, male of *Ph. caryæcaulis*, Fitch ?, dorsal view—the dots in circle indicating natural size.
FIG. 49. Yucca Borer (*Megathymus yuccæ*, Walk.); *a*, *a*, funnels made by the larva; *b*, under ground stem, showing tunnelings of larva.
FIG. 50. Yucca Borer (*Megathymus yuccæ*, Walk.), female moth.
FIG. 51. Yucca Borer (*Megathymus yuccæ*, Walk.); *a*, egg, side view, enlarged; *b*, egg from which the larva has hatched; *bb*, *bbb*, unhatched eggs—natural size; *c*, newly-hatched larva, enlarged; *c c*, full-grown larva, natural size; *d'* underside of head of same, enlarged to show the trophi.
FIG. 52. Yucca Borer (*Megathymus yuccæ*, Walk.), pupa.
FIG. 53. Yucca Borer (*Megathymus yuccæ*, Walk.), moth walking.
FIG. 54. Yucca Borer (*Megathymus yuccæ*, Walk.); *a*, *b*, venation of front and hind wings; *c*, labial palpus denuded; *d*, club of antenna; *e*, *f*, *g*, front, middle and hind legs,—all but wings enlarged.
FIG. 55. *Castnia phalaris* (Fabr.), venation.

REPORT IX.

FIG. 1. Gooseberry Span-worm (*Eufitchia ribearia*, Fitch.); *a*, *b*, larvæ; *c*, pupa.
FIG. 2. Gooseberry Span-worm (*Eufitchia ribearia*, Fitch), female moth.
FIG. 3. Gooseberry Span-worm (*Eufitchia ribearia*, Fitch); *a*, egg, enlarged; *b*, *b*, eggs, natural size.
FIG. 4. Imported Currant-worm (*Nematus ventricosus* Klug); currant leaf showing eggs (1), and the holes which the young worms make (2, 3). [From *Practical Entomologist.*]
FIG. 5. Imported Currant-worm (*Nematus ventricosus* Klug); *a*, *a*, *a*, larvæ; *b*, side view of one joint, enlarged, showing black tubercles.
FIG. 6. Imported Currant-worm (*Nematus ventricosus* Klug); *a*, male fly; *b*, female fly.
FIG. 7. Soldier-bug (*Podisus placidus* Uhler); *a*, enlarged; *b*, natural size.
FIG. 8. Ovipositors of Sawflies; *a*, Willow-apple Sawfly (*Nematus salicis-pomum* Walsh); *b*, Currant-worm Sawfly (*Nematus ventricosus* Klug.), enlarged.
FIG. 9. Native Currant-worm (*Pristiphora grossulariæ* Walsh); *a*, larva, nat. size; *b*, fly enlarged.
FIG. 10. Strawberry-worm (*Emphytus maculatus* Nort.); 1, 2, ventral and lateral views of pupa; 3, enlarged sketch of perfect fly, the wings on one side detached; 4, larva crawling, natural size; 5, perfect fly with wings folded, natural size; 6, larva at rest; 7, cocoon; 8, antenna, enlarged; 9, egg, enlarged.
FIG. 11. Abbot's Pine-worm (*Lophyrus Abbotii* Leach); 1, perfect fly, magnified; the left wings removed; 2, 3, ventral and lateral views of pupa, enlarged; 4, larvæ in different positions, nat. size; 5, cocoon, nat. size; 6, antenna of male, enlarged; 7, antenna of female, enlarged.
FIG. 12. Map showing the distribution of the Colorado Potato-beetle (*Doryphora decemlineata*, Say).

FIG. 13. *Uropoda americana* Riley; *a*, Colorado Potato-beetle attacked by it—nat. size; *b*, the mite, ventral view, showing the penetrating organ lying between the legs; *c*, the organs extended; *d*, the claw; *e*, the excrematitious filament—all greatly enlarged.

FIG. 14. Wheat-head Army-worm (*Leucania albilinea* Guen.); *a*, *a*, larvæ; *b*, eggs—nat. size; *c*, *d*, egg, top and side view—enlarged.

FIG. 15. Wheat-head Army-worm moth (*Leucania albilinea* Guen.).

FIG. 16. *Map* of North America, illustrating the country east of the Rocky Mountains overrun by the Rocky Mountain Locust in 1876.

FIG. 17. *Acridium americanum*, Drury.

FIG. 18. Rocky Mountain Locust (*Caloptenus spretus* Thomas); *a*, *a*, *a*, female in different positions, ovipositing; *b*, egg-pod extracted from ground, with the end; *c*, a few eggs lying loose on the ground; *d*, *e*, shows the earth partially removed, to illustrate an egg-mass already in place and one being placed; *f*, shows where such a mass has been covered up.

FIG. 19. Rocky Mountain Locust (*Caloptenus spretus* Thomas); Anal characters of female, showing horny valves of ovipositor; *b*, an upper valve; *c*, lower valve—all enlarged.

FIG. 20. Rocky Mountain Locust (*Caloptenus spretus* Thomas); oviposition—*i*, superanal plate; *h*, sponge-like exsertile organ—the egg passing through the horny valves of the ovipositor, *g*.

FIG. 21. Rocky Mountain Locust (*Caloptenus spretus* Thomas), egg-mass, enlarged; *a*, side view within burrow, the line of exit of the young locusts shown at *d* and *e*; *b*, egg-mass from beneath; *c*, same from above.

FIG. 22. Rocky Mountain Locust (*Caloptenus spretus* Thomas); *a*, egg, enlarged to show sculpture of outer shell; *b*, portion of same very highly magnified; *c*, the inner shell, just before hatching; *d*, *e*, points where it ruptures.

FIG. 23. Anthomyia Egg-parasite (*Anthomyia radicum*, Linn., var. *calopteni* Riley); fly; *b*, puparium; *c*, larva, side view; *d*, head of same, from above—enlarged.

FIG. 24. Bombyliid larva (*Systœchus* sp.); *a*, enlarged; *b*, head, side view, more enlarged; *c*, do., front view; *d*, posterior spiracle. [See Notes, etc., p. 60.]

FIG. 25. Harpalus? larva; *a*, from above; *b*, head, from beneath; *c*, leg—enlarged; *d*, antenna; *e*, maxilla; *f*, labium.

FIG. 26. Harpalus? larva; A, natural size; B, under side of head, enlarged; *c*, mandible; *e*, antenna; *f*, labium and labial palpi; *g*, maxilla and maxillary palpi; *h*, joint 12 beneath; *i*, joint 11 beneath; *j*, joints 4–10 each beneath—enlarged.

FIG. 27. Pennsylvania Ground-beetle (*Harpalus pensylvanicus*, DeGeer).

FIG. 28. *Erax bastardi* Macq.; *a*, larva; *b*, pupa.

FIG. 29. *Amblychila cylindriformis* Say.

FIG. 30. Hellgrammite (*Corydalus cornutus*, Linn.); *a*, larva; *b*, pupa; *c*, fly, male; *d*, head of female fly.

FIG. 31. Hellgrammite (*Corydalus cornutus*, Linn.); *a*, *a*, egg-masses attached; *b*, one detached, showing lower surface,—all rather below average size; *c*, a few eggs of the outer row; *d*, the newly-hatched larva; *e*, labium; *f*, antenna; *g*, maxilla; *h*, mandible; *i*, tarsal claw; *j*, anal hooks—all enlarged.

FIG. 32. Eggs of *Belostoma?*

FIG. 33. Gigantic Water-bug (*Belostoma grandis* Linn.).

CLASSIFIED LIST OF ILLUSTRATIONS.

The following list of illustrations, brought together in classificatory order, will prove serviceable to entomologists, as it will enable such to readily ascertain whether or not any particular insect of a particular Order has been figured in the Reports. The explanations to the figures are omitted, since they are already given in the preceding list. The nomenclature of the Reports is here, also, retained, and references to figures other than those of insects or their products are omitted. The number of the Report is indicated in Roman and of the figure in Arabic numerals.

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Nematus ventricosus *Klug:* IX, 4, 5, 6.
Emphytus maculatus *Nort.:* IX, 10.
Lophyrus Abbotii *Leach.*: IX, 11.
Aphelinus mytilaspidis *LeBaron:* V, 34.
Trichogramma ? minuta *Riley*: III, 72.
Antigaster mirabilis *Walsh:* VI, 48, 49.
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Glyphe viridascens *Walsh:* II, 24.
Isosoma vitis *Saunders:* I, 73; II, 64.
Isosoma hordei *Harr.:* II, 65.
Eurytoma bolteri *Riley:* I, pl. 2, Figs. 8, 9; I, 97,
Chalcis albifrons *Walsh:* II, 22.
Chalcis mariæ *Riley:* IV, 39.
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Microgaster cocoons on Hog-caterpillar of the Vine (Chær. pampinatrix, *Sm. & Abb.*): II, 47.
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Pimpla annulipes *Br.:* V, 26.
Cryptus samiæ *Pack.:* IV, 40, 41.
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Hemiteles (?) thyridopterygis *Riley:* I, pl. 2, Figs. 10, 11, 12.
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Ophion purgatus *Say:* II, 25; VIII, 38.
Tiphia inornata *Say:* VI, 34.
Ammophila pictipennis *Walsh:* V, 73.
Stizus grandis *Say*, ♀: I, 12.
Eumenes fraterna *Say:* II, 71.
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Calosoma calidum (*Fabr.*): I, 34, 60; II, 70; VIII, 30.
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Aspidoglossa subangulata *Chaud.:* I, 21.
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Harpalus caliginosus *Say:* I, 62; VIII, 29.
Harpalus pensylvanicus (*DeGeer*): I, 23; IX, 27.
Harpalus ? larva: I, 22; IX, 25, 26.
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Gœrius olens: IV, 11.
Philonthus apicalis (*Say*): IV, 10.
Dermestes lardarius *Linn.:* VI, 27.
Hippodamia maculata (*DeGeer*): I, 29; II, 3; VII, 5.
Hippodamia convergens *Guer.:* I, 52; VI, 11.
Hippodamia glacialis (*Fabr.*): IV, 5.
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Cotalpa lanigera (*Linn.*): V, 3.
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Pieris oleracea *Boisd.:* II, 75, 76.
Pieris rapæ *Schrank.:* II, 77, 78, 79.
Danais archippus (*Fabr.*): III, 63, 64, 65, 66, 67.
Limenitis disippus (*Godt.*): III, 68, 69, 70.
Apatura lycaon (*Fabr.*): VI, 39, 40.
Apatura herse (*Fabr.*): VI, 41, 42.
Paphia glycerium *Doubl.:* II, 94, 95, 96; V, 72.
Megathymus yuccæ *Walk.:* VIII, 51, 52, 53, 54.
Castnia phalaris (*Fabr.*) venation: VIII, 35.
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Deilephila lineata (*Fabr.*): III, 60, 61, 62; VIII, 42, 43, 44.
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Philampelus achemon (*Drury*): II, 49, 50, 51.
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Ægeria exitiosa *Say:* I, 17.
Ægeria polistiformis *Harr.:* III, 33.
Ægeria rubi *Riley:* VI, 30.
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Arctia isabella (*Smith*): IV, 65.
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Attacus cynthia (*Hübn.*): IV, 42.
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Agrotis scandens *Riley:* I, pl. 1, Figs. 5, 6, 7.
Agrotis cochranii *Riley:* I, 26.
Agrotis inermis *Harr.:* I, pl. 1, Figs. 1, 2, 3, 4.
Agrotis saucia *Treit.:* III, 49; VIII, 24, 25.
Agrotis telifera *Harr.:* I, pl. I, Figs. 8, 9, 10; I, 28.
Noctua clandestina *Harr.:* I, pl. I, Fig. 13; I, 27.
Hadena subjuncta *Gr. & Rob.:* I, pl. I, Figs. 14, 15, 16, 17.
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Leucania albilinea *Guen.:* IX, 14, 15.
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Prodenia autumnalis *Riley:* III, 45, 46; VIII, 26, 27.
Amphipyra pyramidoides *Guen.:* III, 31, 32.
Anomis xylina (*Say*): II, 12, 13.
Xylina cinerea *Riley:* III, 57.
Plusia brassicæ *Riley:* II, 81.
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Aplodes rubivora *Riley:* I, pl. 2, Fig. 25.
Hæmatopis grataria (*Fabr.*): I, pl. 2, Figs. 18, 19, 20, 21.
Eufitchia ribearia (*Fitch*): IX, 1, 2, 3.
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Pempelia grossulariæ *Pack.:* I, pl. 2, Fig. 17; I, 79.
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Acrobasis juglandis *LeBaron:* IV, 20.
Galleria cereana *Fabr.:* I, 92.
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Penthina vitivorana *Pack.:* I, pl. 2, Figs. 29, 30; I, 76.
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Corimelæna pulicaria (*Germar*): II, 9; VII, 11.
Stiretrus fimbriatus (*Say*): I, 5, 6; II, 10.
Perillus circumcinctus *Stål:* IV, 6.

Arma spinosa *Dallas:* I, 33, 54; II, 7; IV, 8, 9.
Podisus placidus *Uhler:* IX, 7.
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Strachia histrionica *Hahn:* IV, 17.
Coreus tristis (*DeGeer*): I, 55.
Nysius destructor *Riley:* V, 41; VII, 9.
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Campyloneura vitripennis (*Say*): III, 58, 59.
Capsus oblineatus *Say:* II, 83.
Anthocoris insidiosus (*Say*): II, 6; VI, 14; VII, 7.
Reduvius raptatorius *Say:* I, 58.
Harpactor cinctus (*Fabr.*): I, 57; VII, 8.
Piesma cinerea (*Say*): II, 8; VII, 10.
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Cicada septemdecim *Linn.:* I, 6, 7, 13; VII, 40.
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Ceresa bubalus (*Fabr.*): V, 6, 50, 51, 52.
Pœciloptera pruinosa (*Say*): V, 54, 55.
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Eriosoma pyri *Fitch:* I, 64.
Phylloxera vastatrix *Planchon:* III, 39, 40; IV, 28; V, 30; VI, 2, 3, 4, 5, 6, 7, 8; VIII, 48.
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Page III, line 9, for CLASSIFED read CLASSIFIED.

Page 60, line 17, for LEUCANEÆ read LEUCANIÆ.

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